# TECHNICAL SPECIFICATIONS 11.1 CHASSIS

## 1. OPERATING CONDITIONS

| | |
|---|---|
| POWER SUPPLY | 140 TO 265 VAC |
| NOMINAL OPERATING VOLTAGE | 230 VAC |
| TEMPERATURE RANGE | 0 TO 45 DEGREES C |
| HUMIDITY RANGE | YEAR'S MEAN = 75% |
| | MAX= 95% |

## 2. RF SECTION

**2.1** RECEIVING CHANNELS FOR VHF/UHF BAND

| | CCIR B/G | UK I | FRANCE L | OIRT D/K |
|---|---|---|---|---|
| VHF BAND | | | | |
| BAND I | | CHANNEL2-4 | CHANNEL 1-5 | CH 2-4 CH 1-5 |
| BAND III | CHANNEL 5-12 | CHANNEL 6-12 | CH 5-12 | CH6-12 |
| CABLE | S1-S19,S20-S41 | S1-S19,S20-S41 | S1-S16, S21-S41 | S1-S19-S22-S341 |
| UHF BAND | | | | |
| BAND IV-V | CHANNEL 21-69 | CHANNEL 21-69 | CH 21-69 | CH 21-63 |

| | MIN | NOM | MAX | UNIT |
|---|---|---|---|---|
| GAIN LIMITED SENSITIVITY | | | | |
| INPUT SIGNAL LEVEL FOR | | | | |
| STANDARD VIDEO OUTPUT VOLTAGE | | | | |
| BAND 1/3 | – | 20 | – | dB µV |
| BAND 4/5 | – | 23 | – | dB µV |
| NOISE LIMITED SENSITIVITY | | | | |
| INPUT SIGNAL LEVEL FOR 30 dB | | | | |
| (S+N)/N-RATIO, WEIGHTED, CCIR | | | | |
| REC 567 | | | | |
| BAND 1/3/4/5 : | – | 30 | – | dB (µV) |

SELECTIVITY HF+IF

IF FREQUENCIES :

| | B/G | I | L | D/M |
|---|---|---|---|---|
| Picture Carrier | 38.9 | 38.,9 | 38,9 | 38,9 |
| Sound Carrier | 33.4 | 32,9 | 32,4 | 32,4 |
| Colour Carrier | 34,47 | 34,47 | 34.47 | 34.47 |

| VOLTAGE STANDING WAVE RATIO : | MIN | NOM | MAX | UNIT |
|---|---|---|---|---|
| BAND 1/3 : | – | 2 | 4 | – |
| BAND 4/ 5 : | – | 2 | 4 | – |

MAXIMUM INPUT SIGNAL LEVEL :

BAND 1/3 : 100 dB µV (MAX)

BAND 4/ : 100 dB µV (MAX)

## 3. VIDEO OUTPUT SECTION

| | MIN | NOM | MAX | UNIT |
|---|---|---|---|---|
| VIDEO OUTPUT VOLTAGE : | | | | |
| (measured on cathode with | | | | |
| lowest output level, contrast | | | | |
| control and drive control at max : | 90 | 100 | – | V |
| FREQUENCY RESPONSE : | | | | |
| INPUT AERIAL STANDARD, HF SIGNAL : | | | | |
| STANDARD B/G - D/K-I-L : | –10 | –7 | – | dB |
| INPUT: SCART PIN 20 | | | | |
| STANDARD B/G - D/K-I-L : | | –8 | –6 | dB |

## 4. CHROMA SECTION

| | | | | |
|---|---|---|---|---|
| PAL/SECAM | | | | |
| COLOUR CAPTURE RANGE | : +–300 | +–500 | – | HZ |
| PHASE ERROR OF REFERENCE CARRIER | : – | +–5 | 10 | DEGRESS |
| COLOUR KILLER | : 30 | | | dB μV (NOMINAL) |

## 5. SOUND SECTION

| | MIN | NOM | MAX | UNIT |
|---|---|---|---|---|
| SCART OUTPUT S/N RATIO | 40 | 45 | – | dB |

NOISE LIMITED SENSITIVITY : 38 db/V (NOMINAL)
AM SUPRESSION RATIO : 60 db (NOMINAL)
POWER OUTPUT (at 10% distortion) fm= 1KHz : 3.0 or 4.0 Watts Rms (Mono Models)
2x7.0 Watts Rms (Stereo Models)
2x10.0 Watts Rms (Stereo Models)

## 6. SYNCHRONISATION

LINE FREQUENCY LOCKING RANGE : ±300 HZ
VERTICAL FREQUENCY LOCKING RANGE : ± 5HZ

## 7. PICTURE TUBE DRIVE SECTION

EHT : 25.0 ±0.5 KV
FOCUS VOLTAGE : MIN 25.6%
MAX 38%
GRID 2 VOLTAGE RANGE : MIN 300 V, MAX 1350 V
HEATER VOLTAGE : 6.2±0.2 Vms

## Power Supply Voltages

| | | |
|---|---|---|
| B+SUPPLY VOLTAGE (AT Ib=0) | 28" | : 145V±1V |
| | 25" | : 145V±1V |
| | 21" | : 120V±1V |
| | 20" | : 121V±1V |
| | 14" | : 115V±1V |
| 20V OUTPUT Audio Stereo | | : 20.0 ±0.5 VDC |
| 12V OUTPUT Audio Mono | | : 12 ±0.5 VDC |
| 12V OUTPUT | | : 12 ±0.5 VDC |
| 8V OUTPUT | | : 8.0±0.5 VDC |
| 5V OUTPUT | | : 5.0±0.5 VDC |

## 8. OTHERS

AMBIENT OPERATING TEMPERATURE : 0-45 DEGREES C
STORAGE TEMPERATURE : -10 TO + 85 DEGREES C
POWER CONSUMPTION 14" : 75 Watts (max)
20"/21" Mono Models : 95 Watts (max)
20"/21" Stereo Models : 110 Watts (max)
25"/28" : 135 Watts (max)

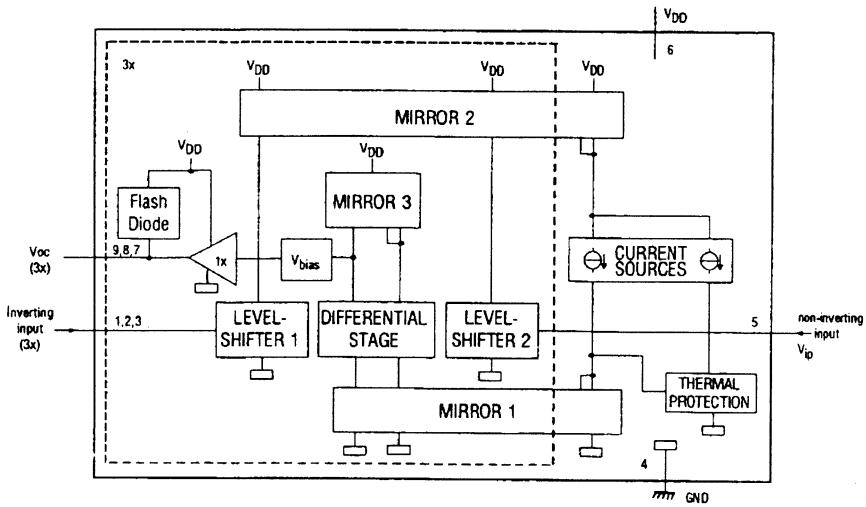
SAFETY : IEC 65 /BS P2N
X-RAY RADIATION : ACC. IEC 65 /BS P2N
Picture Tube Dimensions/Visible Screen Size : 14" (37 cm/34 cm)
20" (51 cm/48 cm)
21" (55 cm/51 cm)
25" (63 cm/59 cm)
28" (70 cm/66 cm)

# TDA6103Q
## Triple video output amplifier
## Features

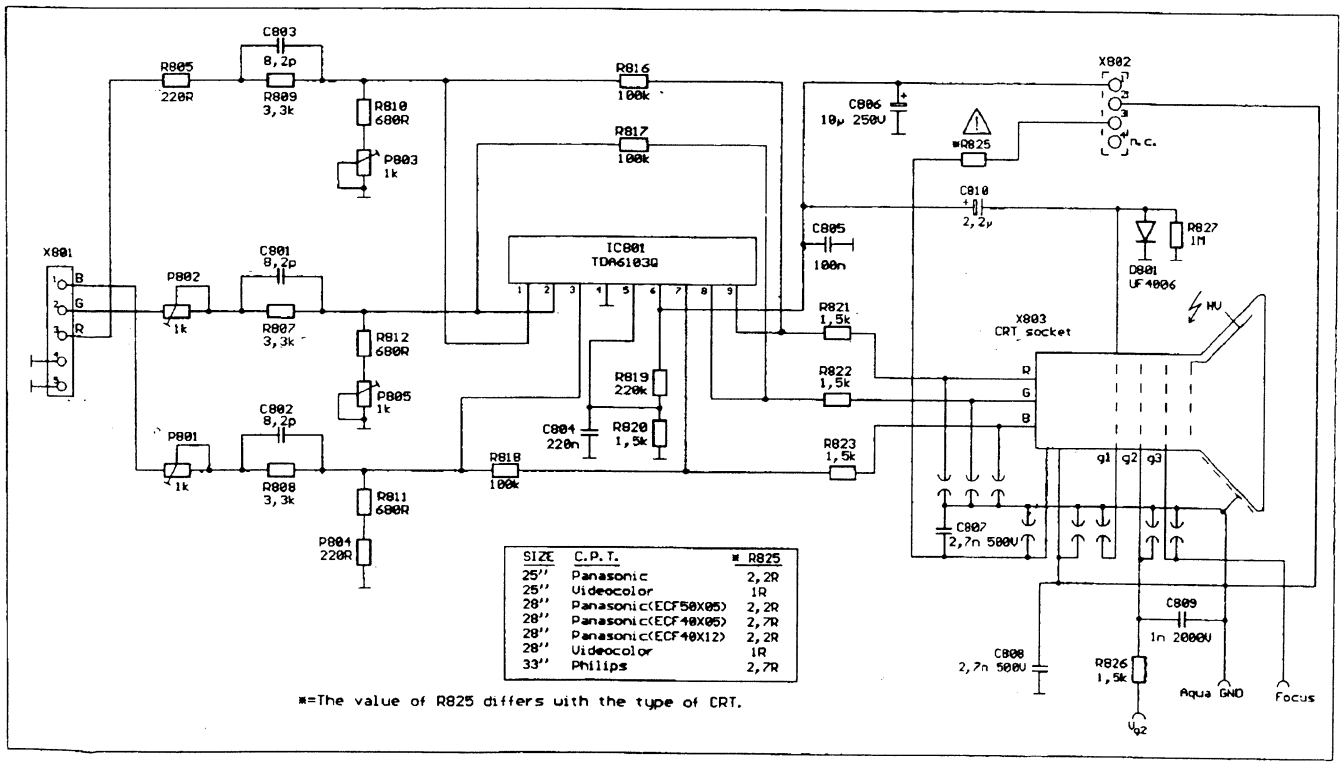
- High bandwidth: 7.5 MHz typical; 60 V (peak-to-peak value
- High slew rate: 1600 V/µs
- Simple application with a variety of colour decoders
- Only one supply voltage needed
- Internal protection against positive appearing Cathode-Ray Tube (CRT) flashover discharges
- One non-inverting input with a low minimum input voltage of 1 V
- Thermal protection
- Controllable switch-off behaviour.

## General Description

The TDA6103Q includes three video output amplifiers in one single in-line 9-pin medium power (SIL9MP) package SOT111BE, using high-voltage DMOS technology, intended to drive the three cathodes of a colour CRT.



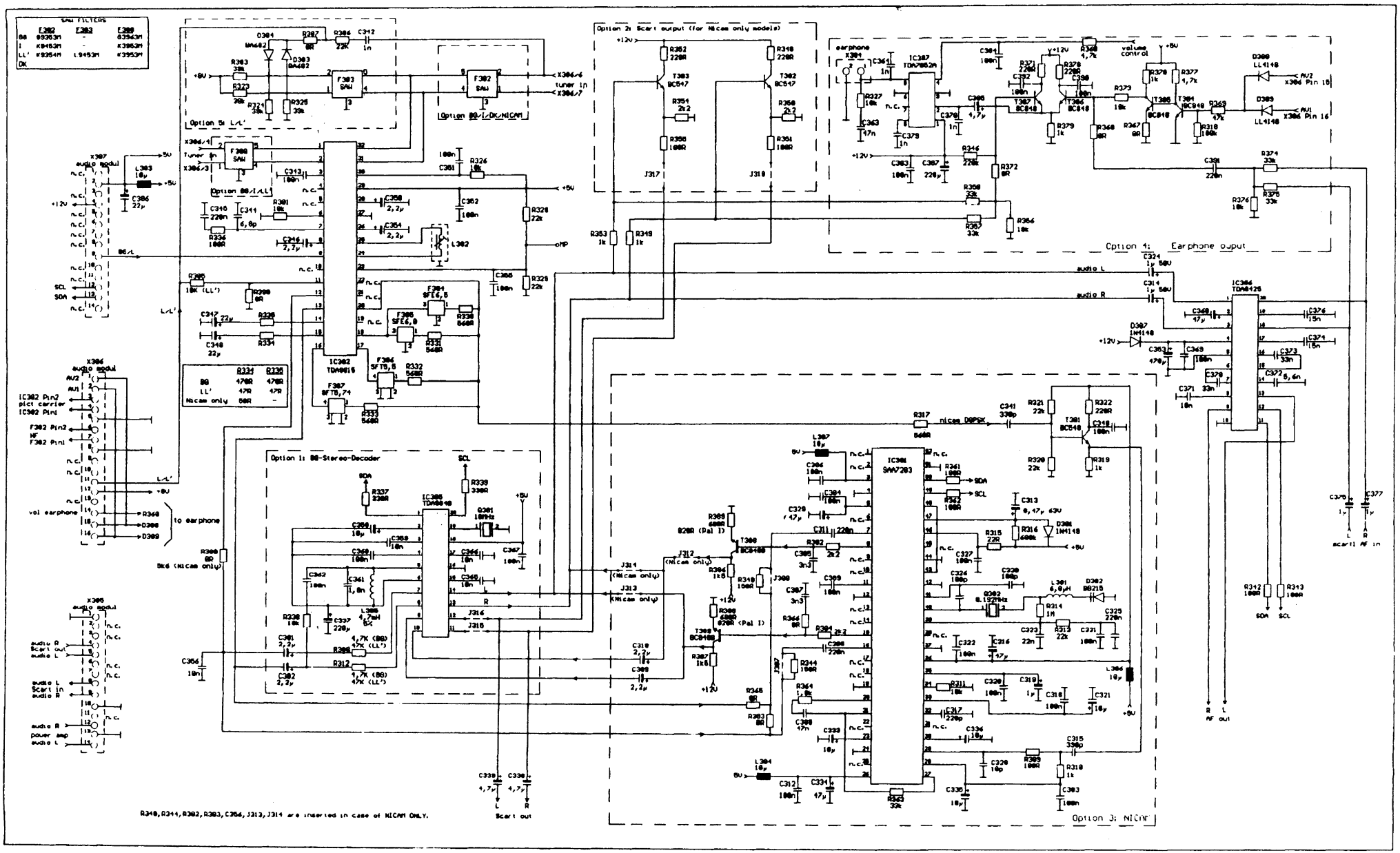

**Block Diagram (one amplifier shown).**



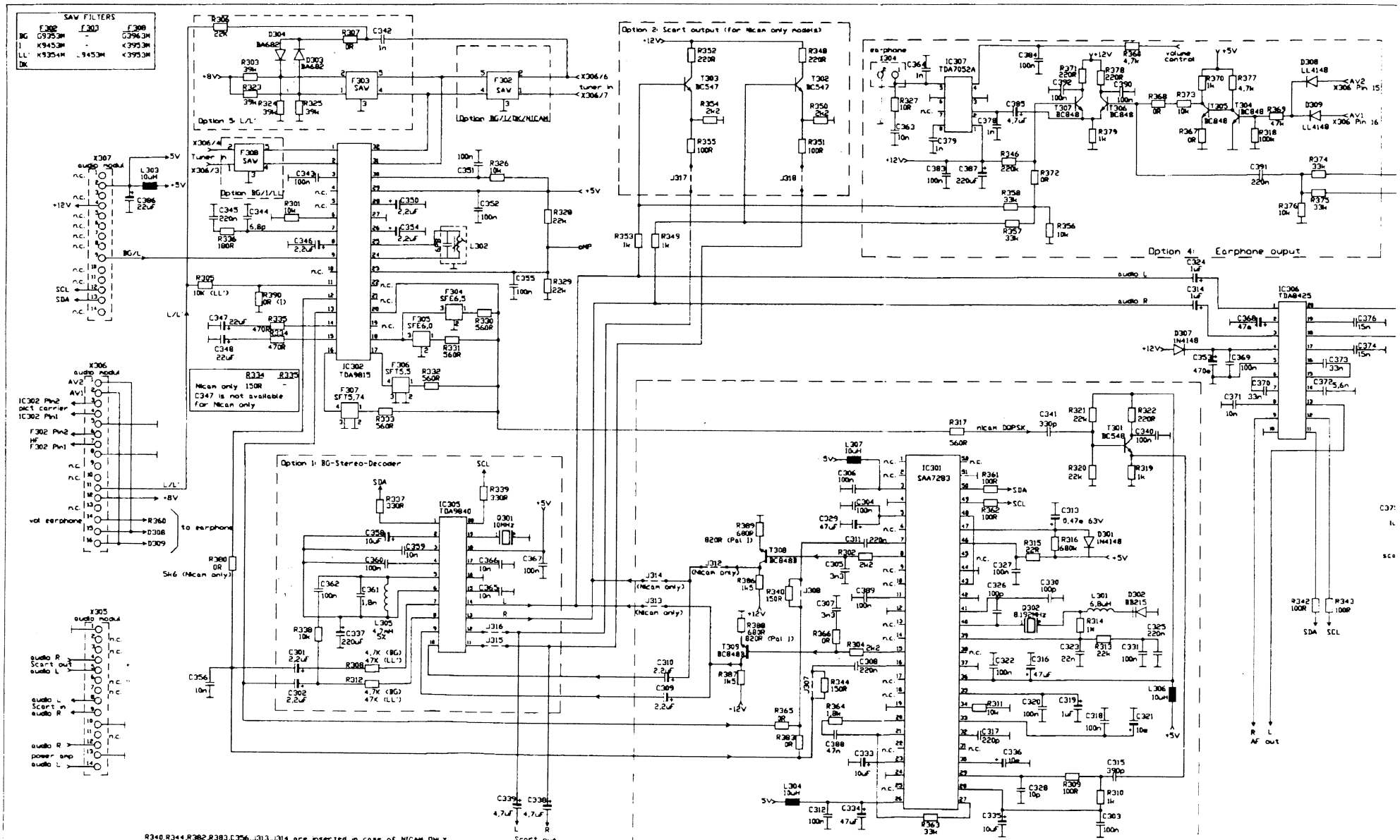

| SIZE | C.P.T. | * R825 |
|---|---|---|
| 25'' | Panasonic | 2,2R |
| 25'' | Videocolor | 1R |
| 28'' | Panasonic(ECF50X05) | 2,2R |
| 28'' | Panasonic(ECF40X05) | 2,7R |
| 28'' | Panasonic(ECF40X12) | 2,2R |
| 28'' | Videocolor | 1R |
| 33'' | Philips | 2,7R |

*=The value of R825 differs with the type of CRT.

# Stereo/Nicam Module



# STEREO / NICAM MODUL (OPTIONAL)



## Circuit Description

In the period before the switch-on threshold is reached the IC is supplied via resistor **R1**; during the start-up phase it uses the energy stored in **C407** under steady state conditions the IC receives its supply voltage from transformer winding 5-6 via diode **D106**. The switching transistor **T401** is a BUZ 90. The parallel connected capacitor C406 and inductance of primary winding 2-8 determine the system resonance frequency. The **R403, C405, D105** circuitry limits overshoot peaks, an **R102** protects the gate of **T401** against static charges.

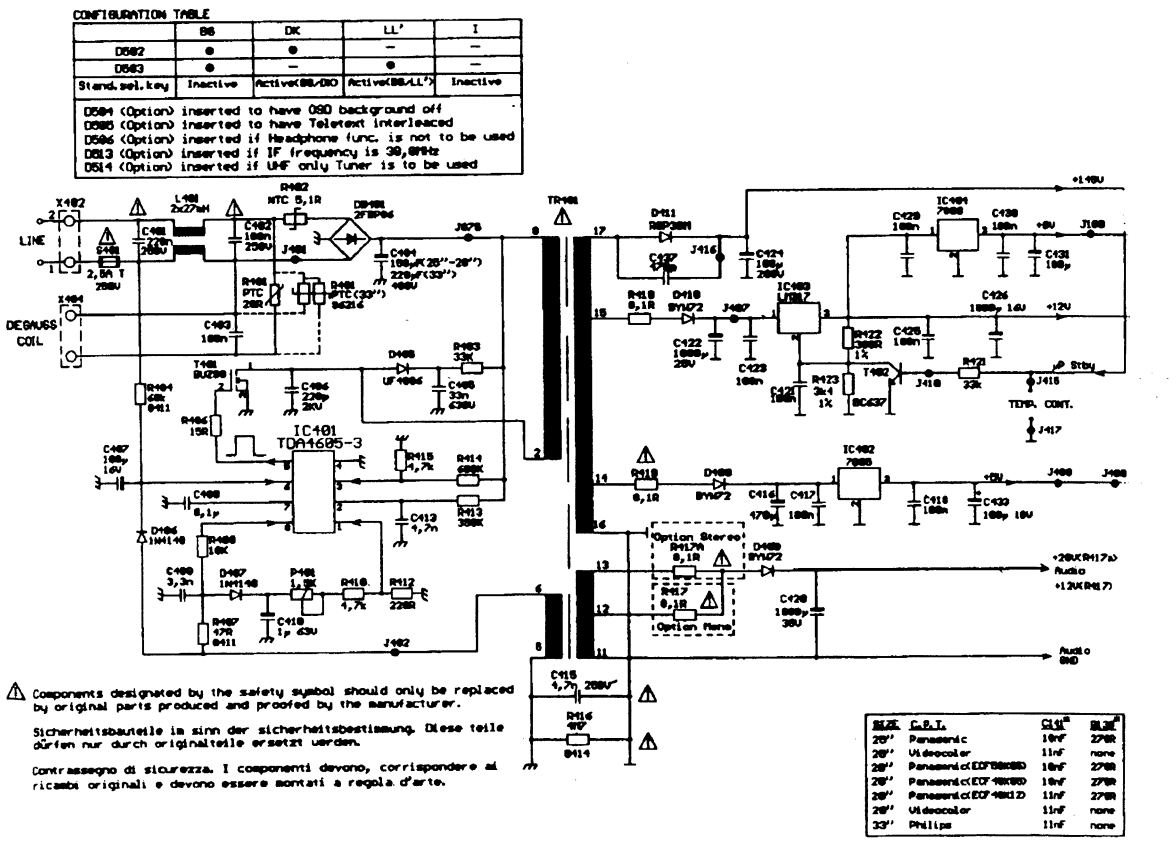
During the conductive phase of the power transistor **T401** the current rise in the primary winding depends on the winding inductance and the mains voltage. The network consisting of **R413, C413** is used to create a model of the sawtooth shaped rise of the collector current. The resulting control voltage is fed into pin 2 of the IC. The RC-time constant given by **R413, C413** must be designed that way that driving the transistor core into saturation is avoided.

The ratio of the voltage divider **R414/R415** is fixing a voltage level threshold. Below this threshold the switching power supply shall stop operation because of the low mains voltage. The control voltage present at pin 3 also determines the correction current for the fold-back point. This current added to the current flowing through **R413** and represents an additional charge to **C413** in order to reduce the turn on phase of **T401**. This is done to stabilize the fold-back point even under higher mains voltages.

Regulation of the switched-mode power supplies via pin 1. The control voltage of winding 5-6 during the off period of **T401** is rectified by **D407** smoothed by **C410** and stepped down at an adjustable ratio by **R412 R410** and **P401** The **R407-C409** network suppresses parasitic overshoots (transformer oscillation). The peak voltage at pin 2, and thus the primary peak current, is adjusted by the IC so that the voltage applied across the control winding, and hence the output voltages, are at the desired level.
When the transformer has supplied its energy to the load, the control voltage passes through zero. The IC detects the zero crossing via series resistors **R408** connected to pin 8. But zero crossings are also produced by transformer oscillation after **T401** has turned off if output is short-circuited. Therefore the IC ignores zero crossings occurring within a specified period of time after **T401** turn-off.

The capacitor **C408** connected to pin 7 causes the power supply to be started with shorter pulses to keep the operating frequency outside the audible range during start-up.

On the secondary side, the output voltages are produced across winding 11 to 17 rectified by **D411, D410, D409, D408** and smoothed by **C424, C422, C416, D420.**


CONFIGURATION TABLE
BG
DK
LL'
I
D502
D503
Stand.sel.key
Inactive
Active(BG/DK)
Active(BG/LL')
Inactive
D504 (Option) inserted to have OSD background off
D505 (Option) inserted to have Teletext interleaced
D506 (Option) inserted if Headphone func. is not to be used
D513 (Option) inserted if IF frequency is 38,9MHz
D514 (Option) inserted if UHF only Tuner is to be used
LINE
DEGAUSS COIL
IC401
TDA4605-3
Option Stereo
Option Mono
TEMP. CONT.
Audio
GND
Components designated by the safety symbol should only be replaced by original parts produced and proofed by the manufacturer.
Sicherheitsbauteile im sinn der sicherheitsbestimmung. Diese teile dürfen nur durch originalteile ersetzt werden.
Contrassegno di sicurezza. I componenti devono, corrispondere ai ricambi originali e devono essere montati a regola d'arte.

# IR TRANSMITTER KS5180

## Description

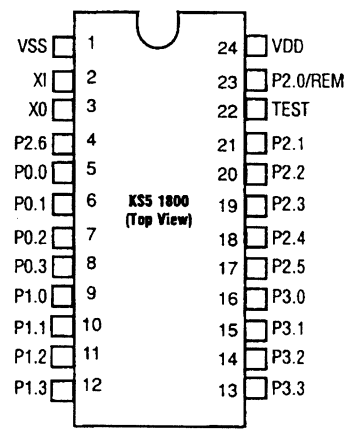
KS51800, a 4-bit single-chip CMOS microcontroller, conssits of the reliable SMCS-51 CPU core with on-chip ROM and RAM. Eight input pins and 11 output pins provide the flexibility for various I/O requirements. The KS51800 microcontroller has been designed for use in small system control applications that require a low-power, cost-censitive design solution. In addition, the KS51800 has been optimized for remote control transmitter.

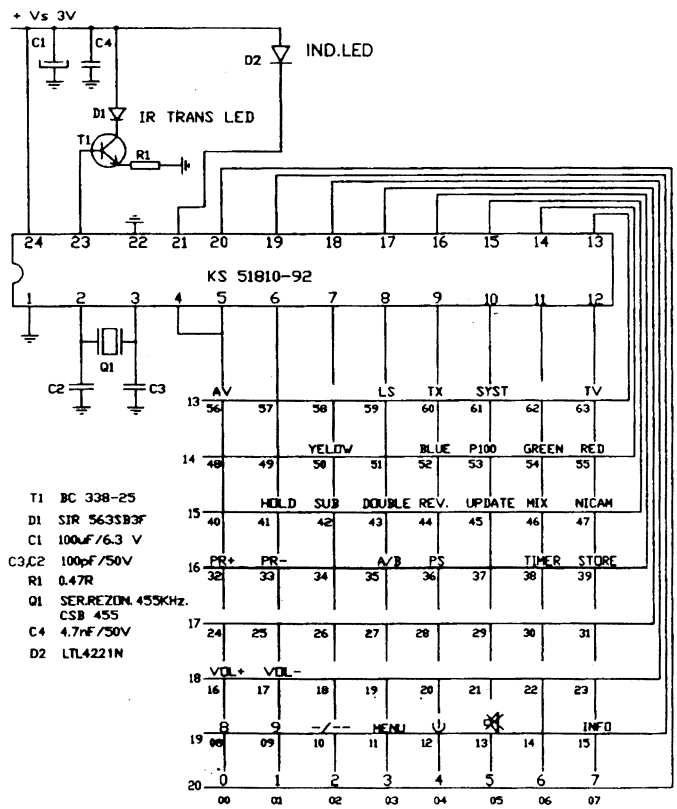
## Features

| | | |
|---|---|---|
| ROM Size | ..... | 1,024 bytes |
| RAM Size | ..... | 32 nibbles |
| Instruction Set | ..... | 39 instructions |
| Instruction Cycle Time | ..... | 13.2 µsec at 455 Khz |
| Input Ports | ..... | Two 4-bit port (Po, P1) |
| Output Ports | ..... | One 4-bit port (P3), One 7-bit port (P2) |
| Buit-in Oscillator | ..... | Fosc/12 (1/4 duty), Fosc/12 (1/3 duty), Fosc/8 (1/2 duty) and no--carrier frequency. |
| Buit-in Power-on reset and outo reset circuit for generating reset pulse every 131,072/Fosc (288 ms at 455 KHz) | | |
| Four Transmission Frequencies | ..... | Fosc/12 (1/4 duty), Fosc/12 (1/3 duty), Fosc/8 (1/2 duty) and no-carrier frequency. |
| Supply Voltage | ..... | 2.2 V - 5.5 V |
| Power Consumption | ..... | Halt mode; 1 µA (maximum)<br>Normal mode: 0.34 mA (typical) at 700 KHz |
| Operating temperature | ..... | - 20°C- 85°C |
| Package Type | ..... | 24 DIP-SK, 24 SOP |

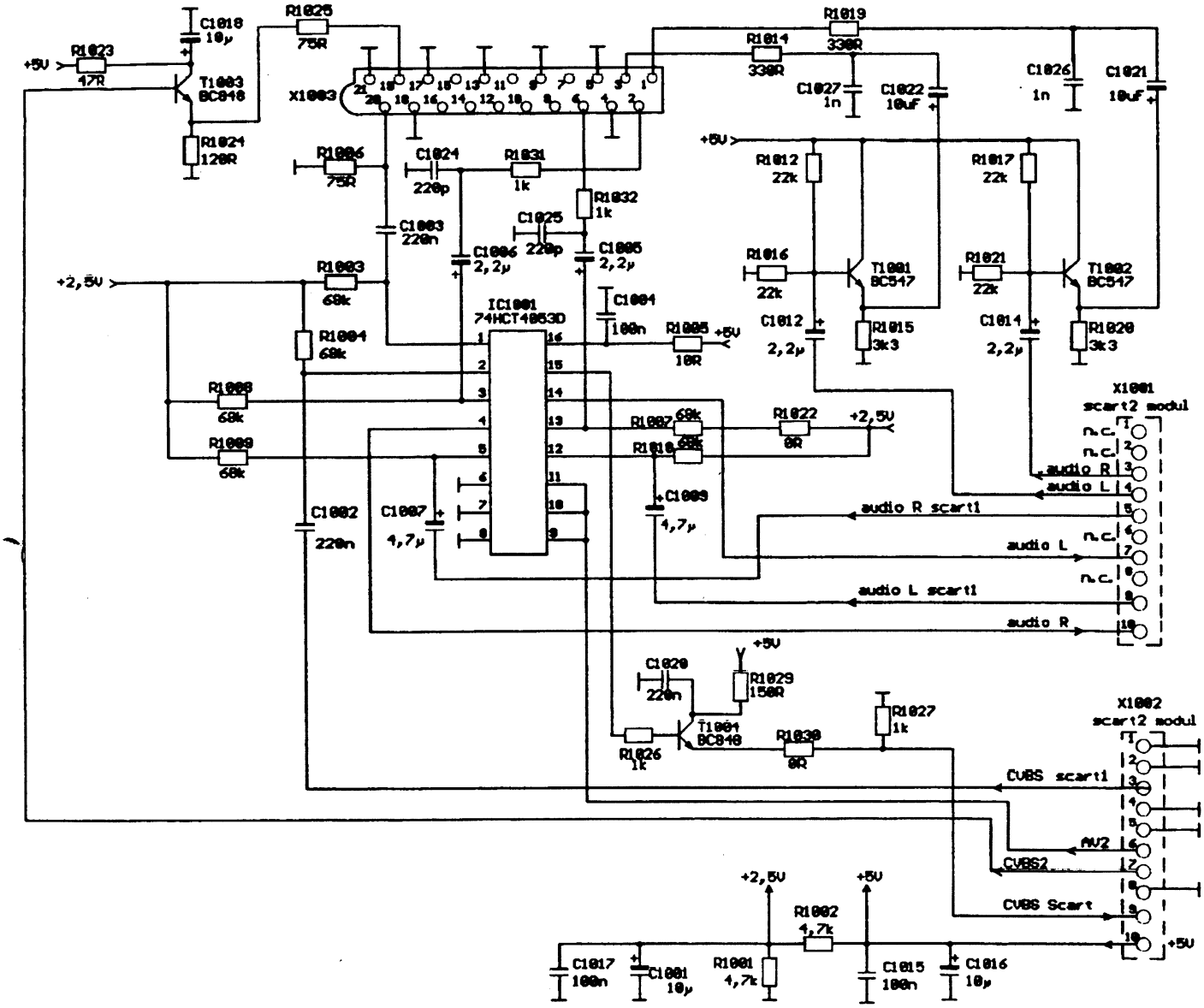
## Pin Description

| Symbols | Pin No. | Type | Functions | I / O Circuit Type |
|---|---|---|---|---|
| P0.0–P0.3 | 5,6,7,8 | Input | 4-bit input port when P2.13 is low | A |
| P0.0–P0.3 | 9,10,11,12 | Input | 4-bit input port when P2.13 is high | A |
| P2.0/REM | 23 | Output | 1-bit individual output for remote carrier frequency* | B |
| P2.1–P2.6 | 21,20,19,18 17,4 | Output | 1-bit individual output port | C |
| P3.0–P3.3 | 16,15,14,13 | Output | 4-bit parallel output port | C |
| TEST | 22 | Input | Input pin for test (Normally connected to VSS) | |
| XI | 2 | Input | Oscillation clock input | |
| X0 | 3 | Output | Oscillation clock output | |
| VDD | 24 | | Power supply | |
| VSS | 1 | | Ground | |

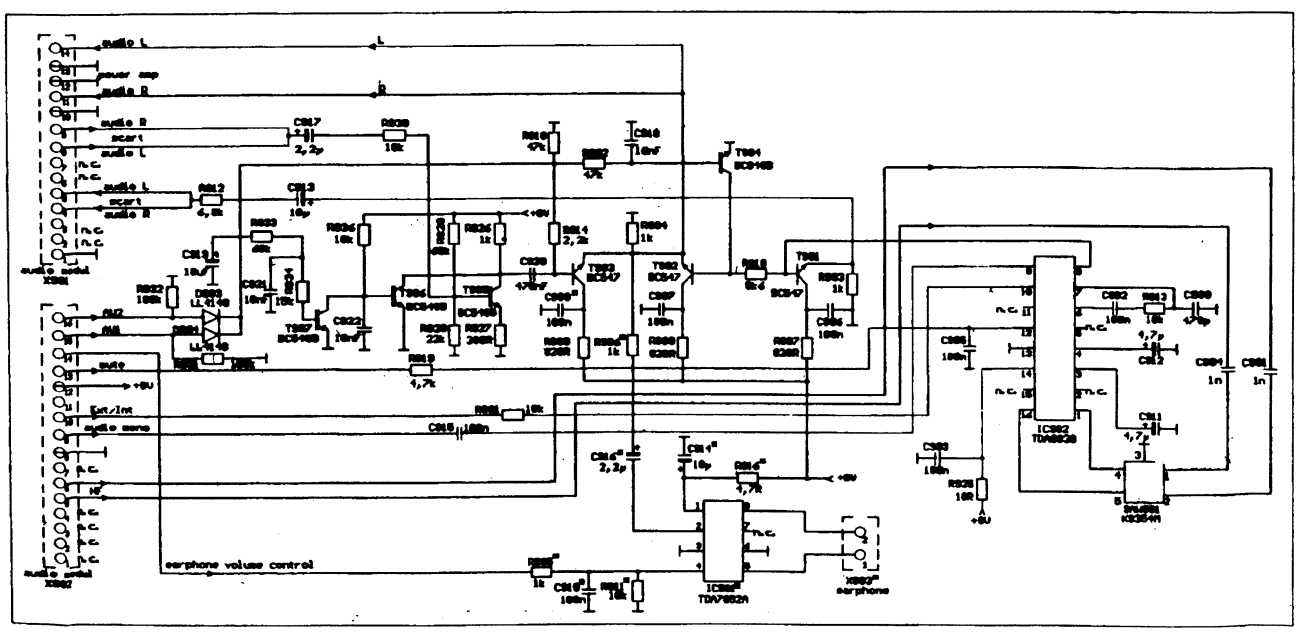


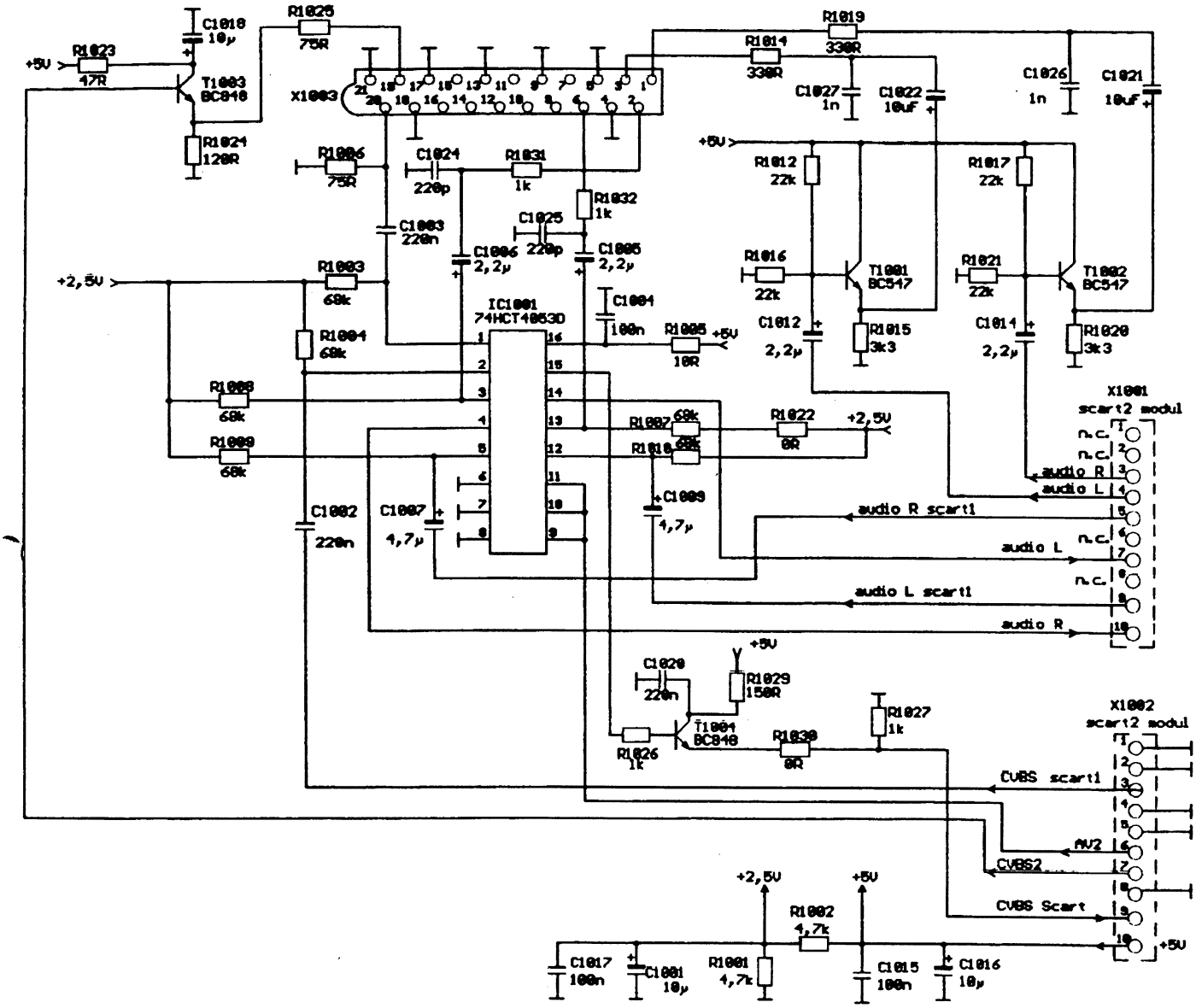
# Double Scart Module



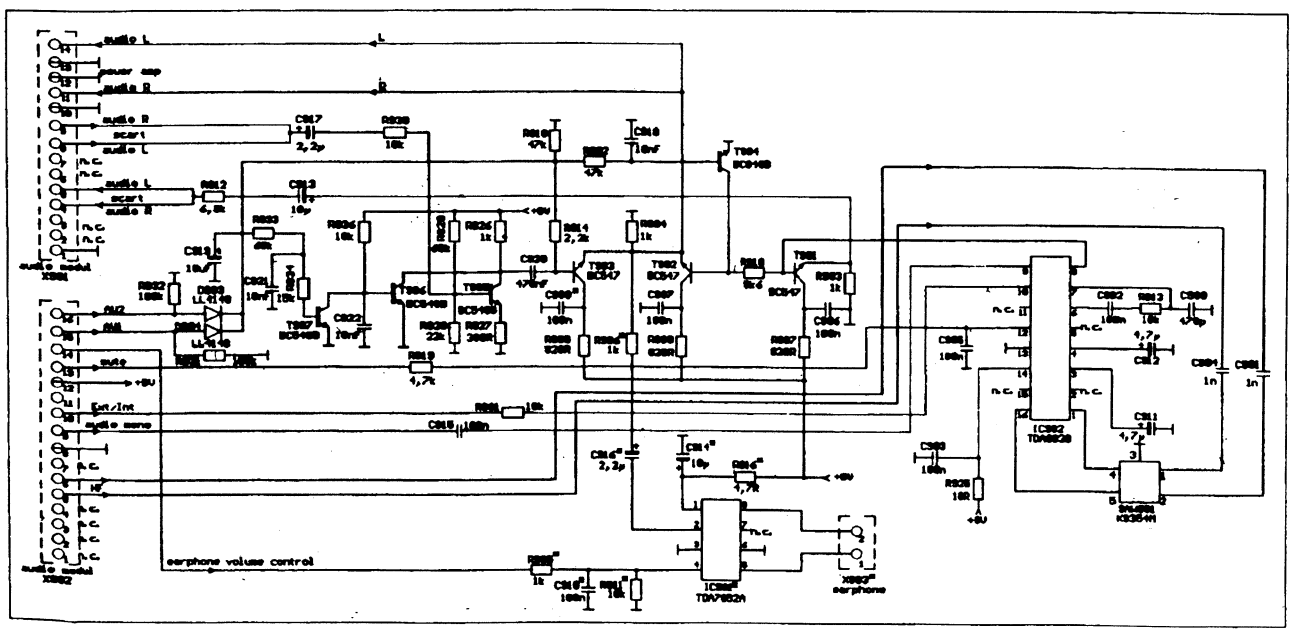

# Secam L'am Module



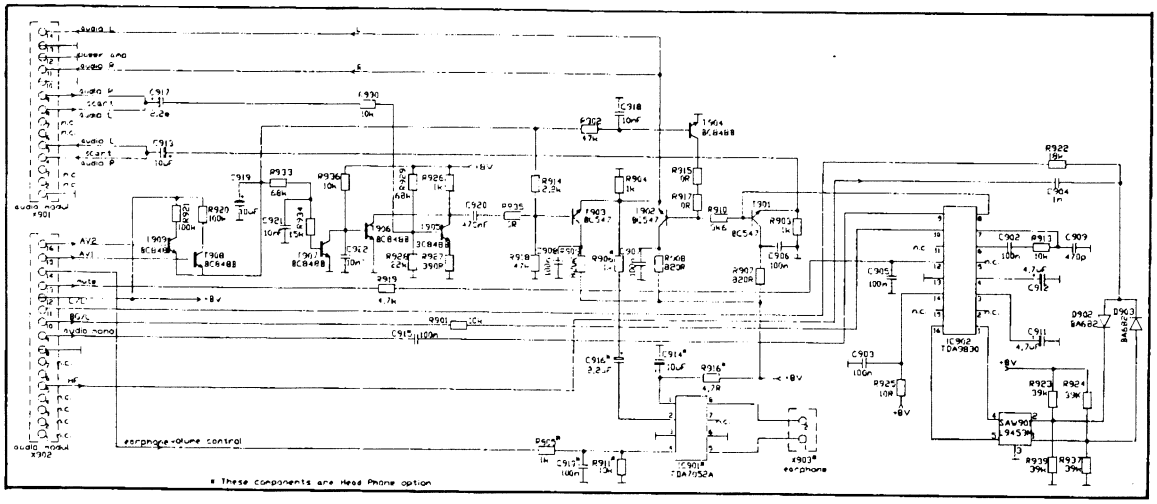
# Double Scart Module



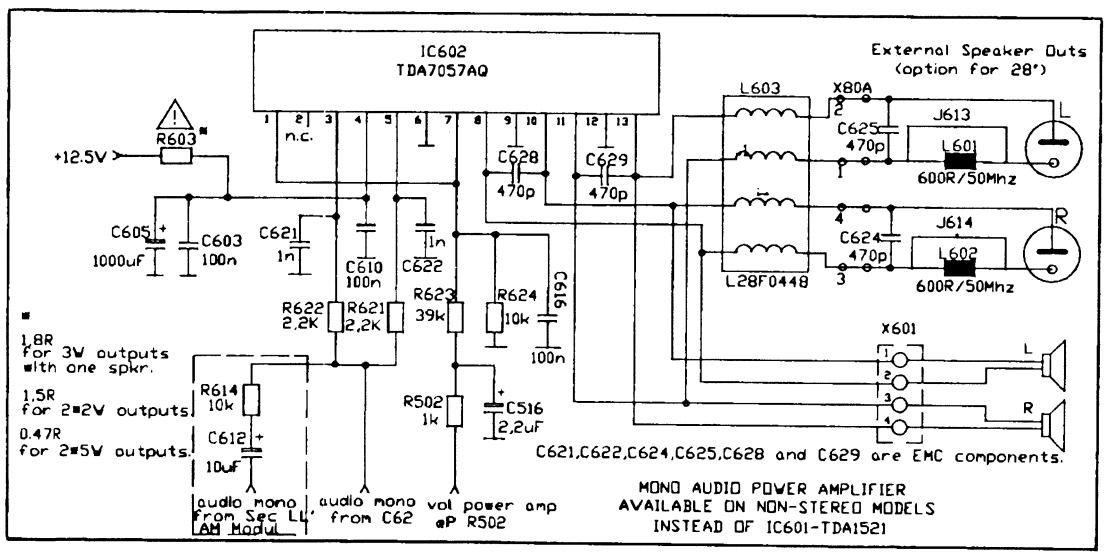

# Secam L'am Module

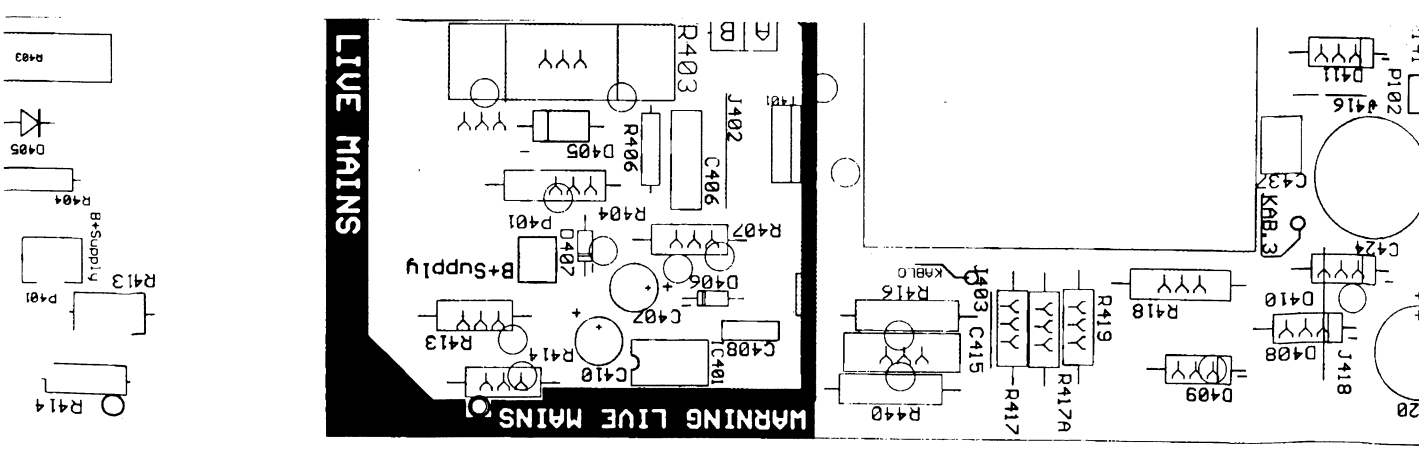


## SECAM L'AM MODUL




## MONO AF POWER MODUL



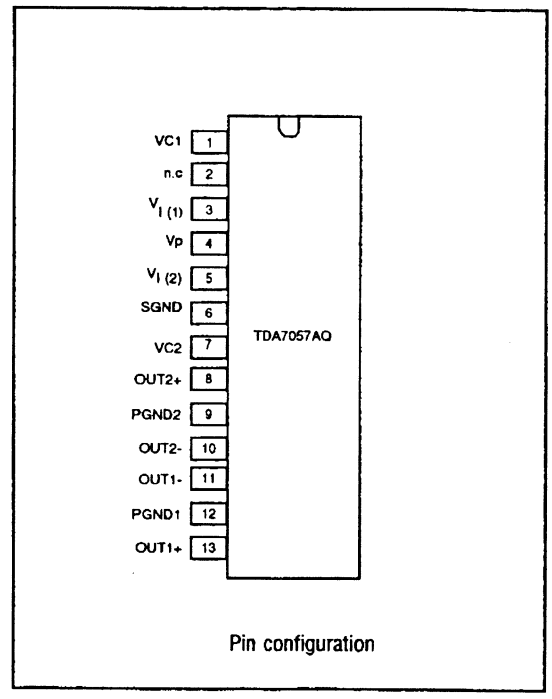




## MAIN CHASSIS

# 2 x 5 W setereo BTL audio output ampilifier with DC volume control

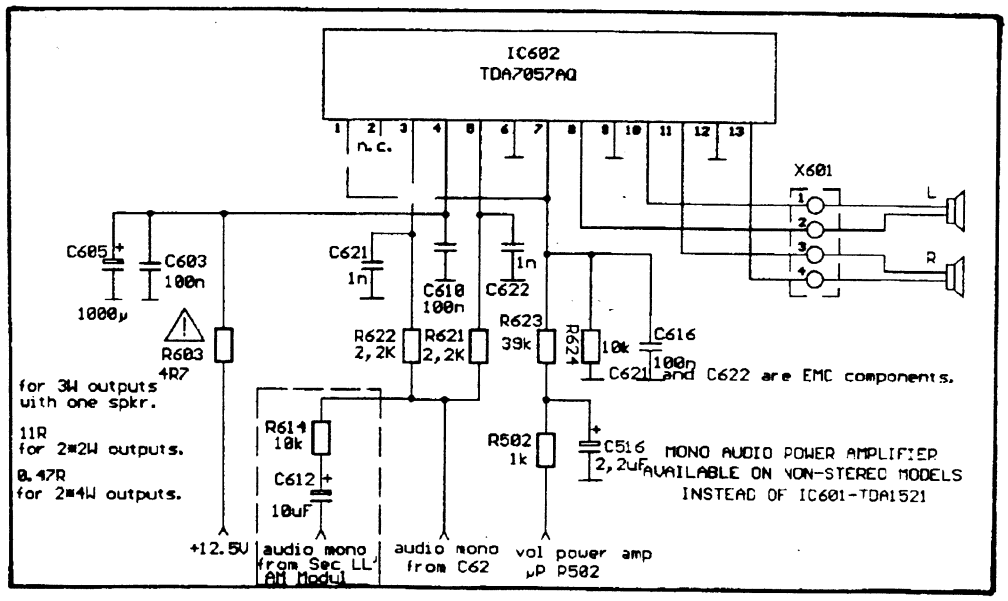
## Pinning

| SYMBOL | PIN | DESCRIPTION |
|---|---|---|
| VC1 | 1 | DC volume control 1 |
| n.c | 2 | not connected |
| $V_I$ (1) | 3 | voltage input 1 |
| Vp | 4 | positive supply voltage |
| $V_I$ (2) | 5 | voltage input 2 |
| SGND | 6 | signal ground |
| $VC_2$ | 7 | DC volume control 2 |
| OUT2+ | 8 | positive output 2 |
| PGND2 | 9 | power ground 2 |
| OUT2- | 10 | negative output 2 |
| OUT1- | 11 | negative output 1 |
| PGND1 | 12 | power ground 1 |
| OUT1+ | 13 | positive output 1 |




Pin configuration

## Mono AF Power Module



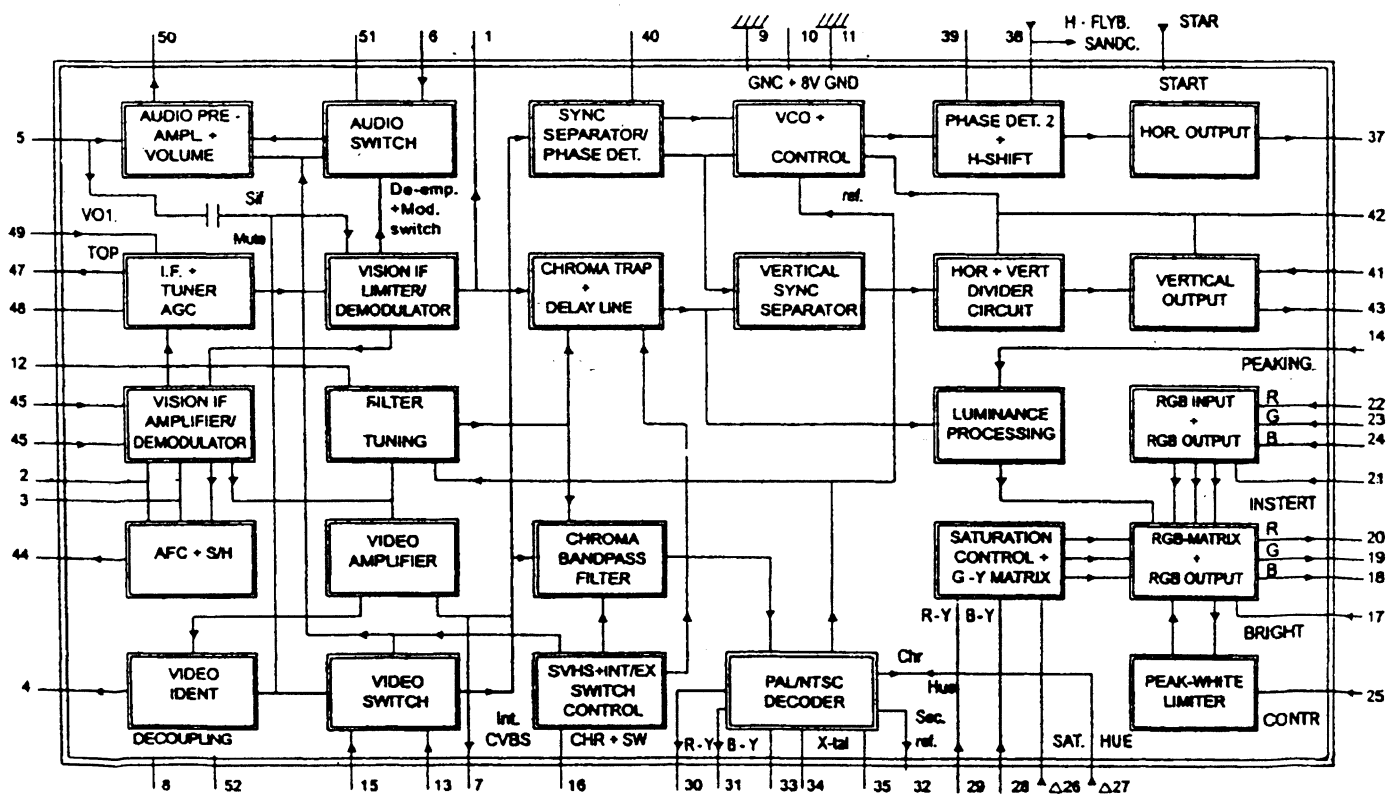
**TDA 8362 Multistandard TV Processor**
**TDA 8361 Pal TV Processor**

Vision IF amplifier, video demodulator, video amplifier, AGC and AFC are suitable for both negative and positive modulation.
Sound limiter, demodulator and amplifier with volume control.
Inputs and switches for external audio and CVBS signals.
Synchronization circuit with drive circuits for horizontal and vertical deflection.
Separate supply pin for starting the horizontal oscillator from the main rectifier.
X-ray protection (combined with the 2 $^{no}$ phase detector phase detector pin).
PAL/NTSC colour decoder in which the chroma filters (bandpass and trap) and the luminance delay line have been integrated. The circuit has a separate chroma input and the filters can be switched-off so that S-VHS signals (via an external switch) can be applied to the IC.
For SECAM applications an (alignment-free) SECAM- decoder can be added to the IC.
Peaaking circuit in the luminance channel.
RGB- output circuit with linear inputs for On-Screen Character Display.

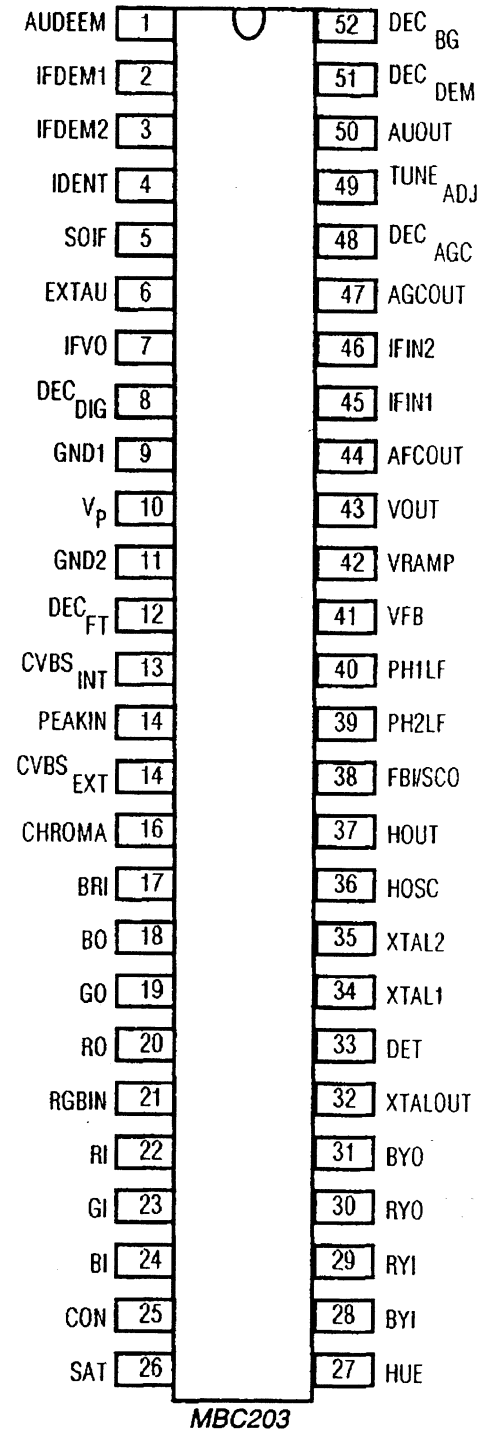
The supply Voltage for the IC is 8 Volts. It is mounted in an S-DIL envelope with 52 pins.

b) Features
-Multi-standard vision IF circuit
(positive and negative modulation)
-Multi-standard FM sound demodulator (4.5MHz to 6.5 MHz)
-Video and audio switches
(CVBS int/ext, S-VHS and audio int/ext)
-Integrated chroma trap and bandpass filters (auto-calibrated)
-Luminance delay line integrated
-PAL/NTSC colour decoder with automatic search system
-Easy interfacing with linear RGB inputs and fast blanking
-RGB-control circuit with linear RGB inputs and fast blanking
-Horizontal synchronization with two control loops and an alignment-free horizontal oscillator, vertical count-down circuit and a vertical pre-amplifier
-Low dissipation (only 600 mW)
-Small amount of peripheral components compared with completion IC's.
-Only one adjustment (vision IF demodulator)

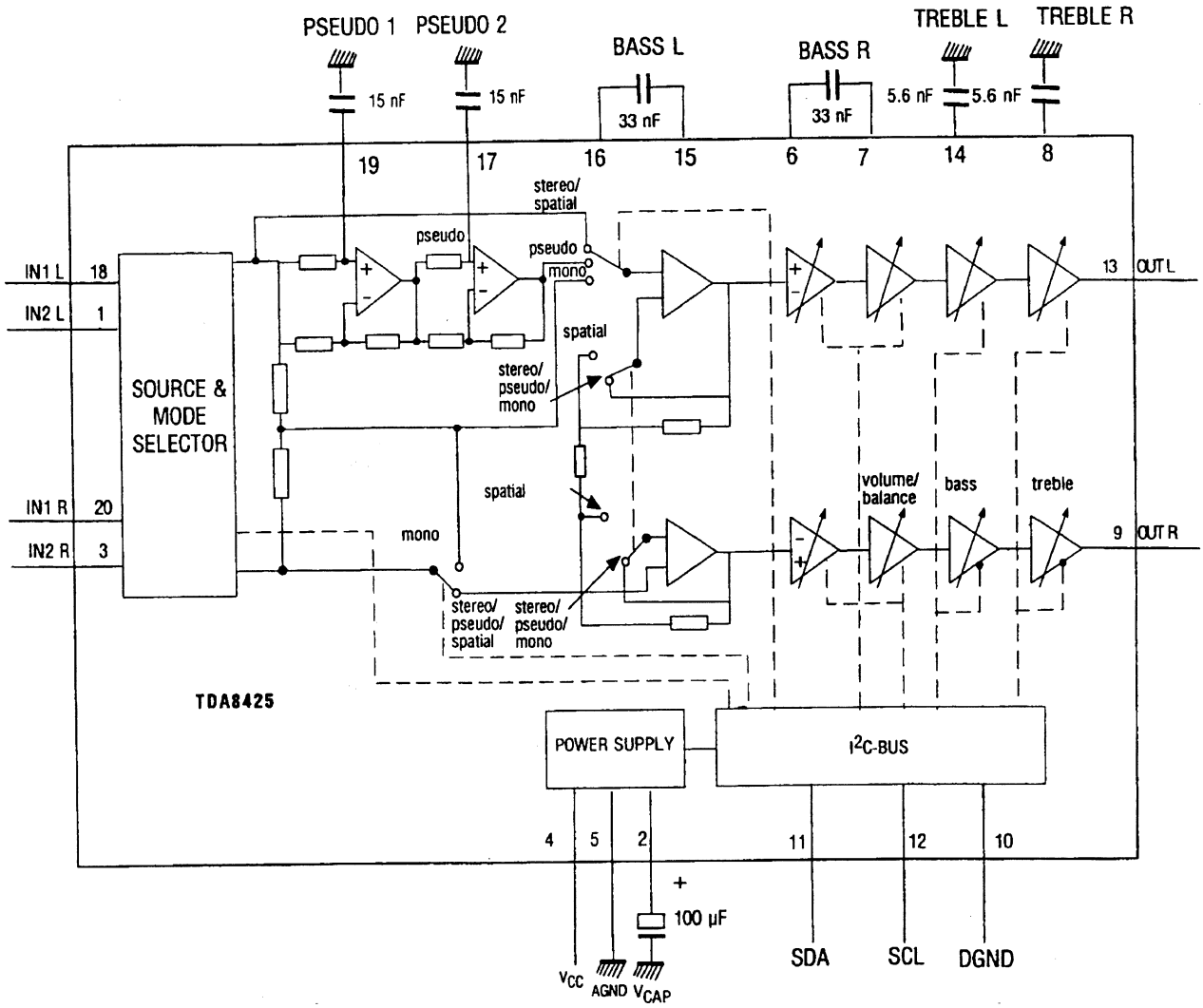
## 2) Block Diagram



| SYMBOL | PIN | DESCRIPTION |
|---|---|---|
| AUDEMM | 1 | audio de-emphasis |
| IFDEM1 | 2 | IF demodulator tuned circuit |
| IFDEM2 | 3 | IF demodulator tuned circuit |
| IDENT | 4 | video identification output |
| SOIF | 5 | sound IF input and volume control |
| EXTAU | 6 | external audio input |
| IFVO | 7 | IF video output |
| DEC DIG | 8 | decoupling digital supply |
| GND1 | 9 | ground 1 |
| V | 10 | positive supply voltage (+8 V) |
| GND2 | 11 | ground 2 |
| DEC FT | 12 | decoupling filter tuning |
| CVBS INT | 13 | internal CVBS input |
| PEAKIN | 14 | peaking control input |
| CVBS EXT | 15 | external CVBS input |
| CHROMA | 16 | chrominance and A/V switch input |
| BRI | 17 | brightness control input |
| BO | 18 | blue output |
| GO | 19 | green output |
| RO | 20 | red output |
| RGBIN | 21 | RGB insertion and blanking input |
| RI | 22 | red input |
| GI | 23 | green input |
| BI | 24 | blue input |
| CON | 25 | contrast control input |
| SAT | 26 | saturation control input |
| HUE | 27 | hue control input (or chrominance output) |
| BYI | 28 | B-Y input signal |
| RYI | 29 | R-Y input signal |
| RYO | 30 | R-Y output signal |
| BYO | 31 | B-Y output signal |
| XTALOUT | 32 | 4.43 MHz output for TDA8395 |
| DET | 33 | loop filter burst phase detector |
| XTAL1 | 34 | 3.58 MHz XTAL connection |
| XTAL2 | 35 | 4.43 MHz XTAL connection |
| HOSC | 36 | start horizontal oscillator |
| HOUT | 37 | horizontal output |
| FBI/SCO | 38 | flyback input/sandcastle output |
| PH2LF | 39 | phase 2 loop filter |
| PH1LF | 40 | Phase 1 loop filter |
| VFB | 41 | Vertical feedback input |
| VRAMP | 42 | Vertical ramp generator |
| VOUT | 43 | vertical output |
| AFCOUT | 44 | AFC output |
| IFIN1 | 45 | IF Iput 1 |
| IFIN2 | 46 | IF Input 2 |
| AGCOUT | 47 | tuner AGC output |
| DEC | 48 | AGC decoupling capacitor |
| TUNE | 49 | tuner take-over adjustment |
| AUOUT | 50 | audio output |
| DEC Dem | 51 | decoupling sound demodulator |
| DEC BG | 52 | decoupling bandgap supply |



MBC203




**Block Diagram**

**Pinning**

| SYMBOL | PIN | DESCRIPTION |
|---|---|---|
| $V_{i\ VIF}$ | 1 | VIF differential input signal A |
| | 2 | |
| $C_{BL/MAC}$ | 3 | black level detector / MAC capacitor |
| $V_{i\ VIF}$ | 4 | VIF differential input signal B |
| | 5 | |
| TADJ | 6 | tuner AGC takeover adjust (TOP) |
| $T_{PLL}$ | 7 | PLL loop filter |
| $C_{SAGC}$ | 8 | SIF AGC capactior |
| STD | 9 | standard switch |
| $V_{o\ CVBS}$ | 10 | CVBS output signal |
| FMLSWI | 11 | FM input select and L /L accent switch |
| $V_{o\ AF1}$ | 12 | audio frequency output 1 |
| $V_{o\ AF2}$ | 13 | audio frequency output 2 |
| $C_{AF2}$ | 14 | decoupling capacitor 2 |
| $C_{AF1}$ | 15 | decoupling capacitor 1 |
| $V_{i\ FM2}$ | 16 | sound intercarrier input 2 |
| $V_{i\ FM1}$ | 17 | sound intercarrier input 1 |
| $V_{i\ FM3}$ | 18 | sound intercarrier input 3 |
| TAGC | 19 | tuner AGC output |
| $V_{o\ QSS}$ | 20 | single reference OSS output |
| $V_{o\ vid}$ | 21 | composite video output |
| $V_{i\ vid}$ | 22 | video buffer input |
| AFC | 23 | AFC output |
| VCO1 | 24 | VCO reference circuit for 2fpc |
| VCO2 | 25 | |
| $C_{Vp/2}$ | 26 | Vp/2 reference capacitor |
| GND | 27 | Vground |
| CVAGC | 28 | VIF AGC capacitor |
| Vp | 29 | positive supply voltage |
| INSWI | 30 | VIF input switch |
| $V_{i\ SIF}$ | 31 | SIF differential input signal |
| | 32 | |

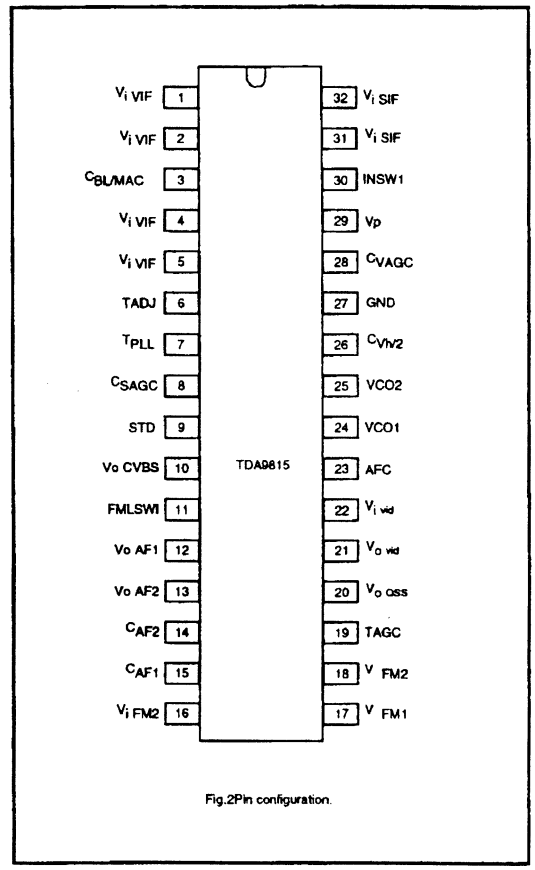



Fig.2Pin configuration.

## Video buffer

For an easy adaption of the sound traps an operational ampilifier with internal feedback is used in the event of B/G and L standard. This ampilifier is featured with a high bandwidth and 7 dB gain.

## SIF amplifier and AGC

The sound IF amplifier consists of two AC coupled differential amplifier stages.

## Single reference QSS mixer

The single reference OSS mixer is realized by a multiplier. THe SIF amplifier output signal is fed to the single reference OSS mixer and converted to intercarrier frequency by the regenerated picture carrier (VCO).

## AM demodulator

The AM demodulator is realized by a multiplier. The modulated SIF amplifier output signal is multiplied in phase with the limited (AM is removed) SIF amplifier output signal.

## FM detectors

Each FM detector consists of a limiter, an FM-PLL and a AF amplifier. The limiter provides the amplification and limitation of the FM sound intercarrier signal before demodulation.
1) The AF preamplifier for FM sound is an operational amplifier with internal feedback, high gain and high common mode rejection.
2) The AF output amplifier (10 dB) provides the required output level by means of a rail-to-rail output stage.

## Internal voltage stabilizer and Vp/2-reference

The bandgap circuit internally generates a voltage of approximately 1.25 V, independent of supply voltage and temperature.

# TDA9815
# Multistandart/MAC VF-FLL with QSS-IF and dual FM-PLL/AM demodulator

## General Description

The TDA9815 is an integrated circuit for multistandard vision IF signal processing (inclusive MAC) and sound AM- and Dual-FM demodulation, with single reference QSS-IF in TV and VTR sets.

## Functional Description

## Vision IF amplifier and input switch

The vision IF amplifier consists of three AC-coupled differential ampilifier stages.

## Tuner and VIF AGC

The AGC capacitor voltage is transferred to an internal IF control signal, and is fed to the tuner AGC to generate the tuner AGC output current on ping 19 (open-collector output). The AGC detector charges/discharges the AGC capacitor to the required voltage for setting of VIF and tuner gain in order to keep the video signal at a constant level. The additional level information is given by the black level detector voltage.

## Frequency-Phase detector (FPLL)

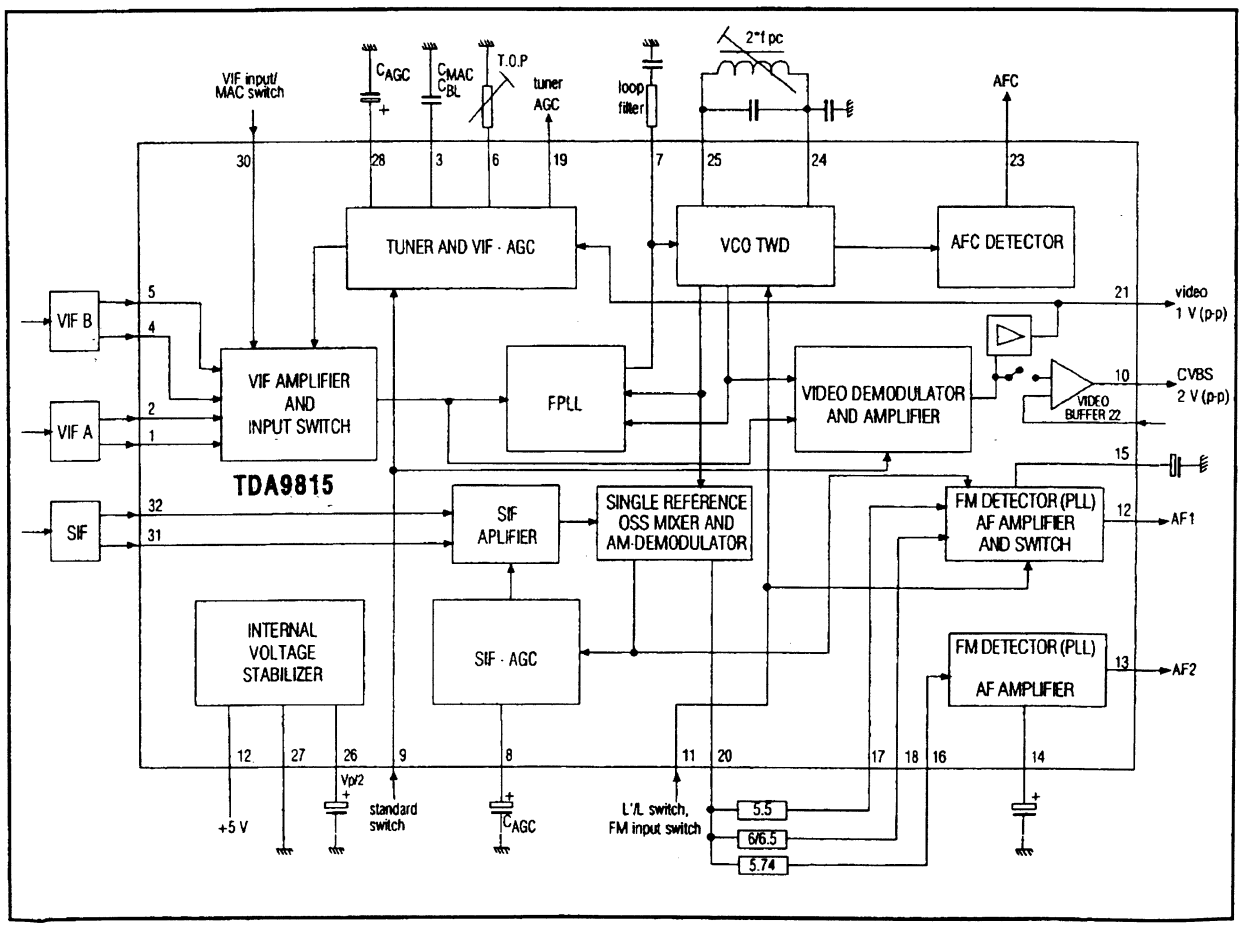
The VIF-amplifier output signal is fed into a frequency detector and into a phase detector via a limiting amplifier. In the event of positive modulated signals the phase detector is gated by composite sync in order to avoid signal distortion for overmodulated VIF signals.

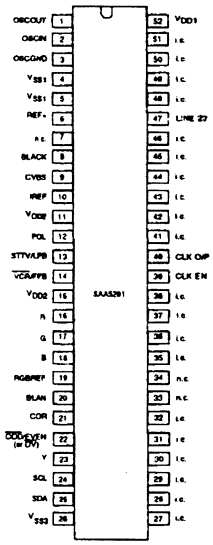
## VCO, travelling wave divider and AFC

The VCO operates with a resonance circuit (with L and C in parallel) at double the PC frequency. The VCO is controlled by two integrated vercaps. Furthermore the VCO centre frequency can be decreased (required for L accent standard) by activating an additional internal capacitor. This is achieved by using the FM input and L accent switch pin 11.

## Video demodulator and amplifier

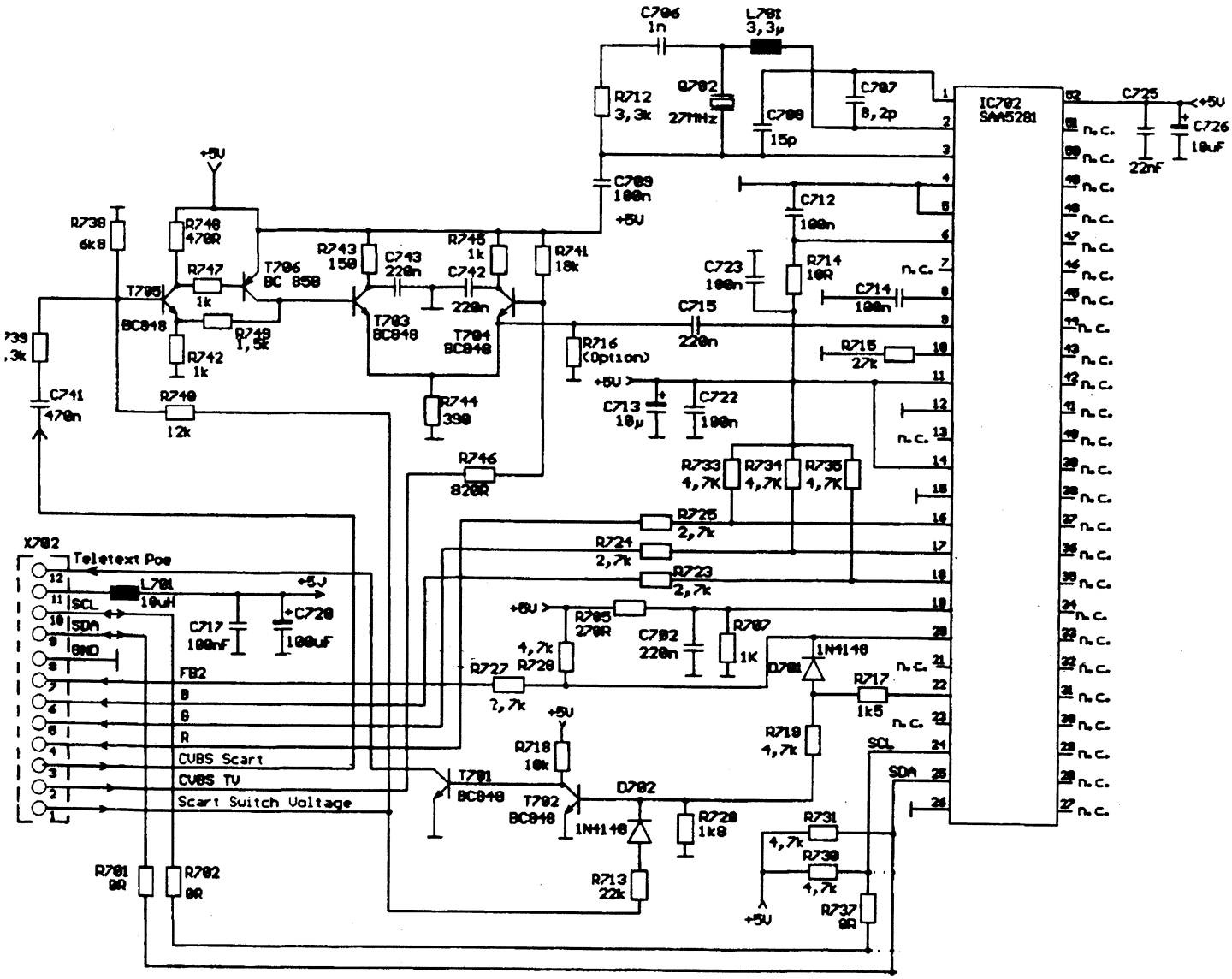
The video demodulator is realized by a multiplier which is designed for low distortion and large bandwidth.





Pin configuration; S

| Type | Language | | | | | |
|---|---|---|---|---|---|---|
| SAA5281P/E | English | German | Swedish | Italian | French | Spanish |
| SAA5281P/T | English | German | Türkish | Italian | French | Spanish |
| SAA5281P/H | Polish | German | Swedish | Serbo-croat | Czechoslovakia | Rumanian |
| SAA5281P/R | Estonian | Lettish /Lithuanian | Russian | | | |
| SAA5281P/K | French | Arabic | | | | |
| SAA5281P/L | English | Hebrew | Arabic | | | |
| | | | | | | |




**TELETEXT**

## SERVICE ADJUSTMENTS

### 1- Supply voltage adjustment

Adjust +B voltage, measured at the cathode of the diode D411, while screen potentimometer set to the minimum. For 28" to 145V ± 1V
25" to 145V ± 1V
21" to 120V ± 1V
20" to 121V ± 1V
14" to 115V ± 1V

with P 401 potentimometer.

Set the screen potentiometer to a proper level to adjust the focus voltage.

### 2- IF 38.9 MHz adjustment

Apply an antenna signal with 60dBµV ± 1dBµV (1mV) level to the set. Adjust L4 coil until the wave form shown on Fig. 1 at PIN of scart connector is received.

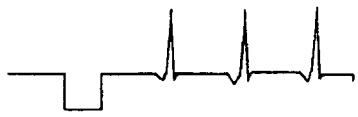


**Fig 1**

### 3- AGC Adjustment

Apply an antenna signal with 60dBµV ± 1dBµV (1mV) level to the set. Observe the voltage at PIN 5 of tuner by adjusting P2 potentiometer.The voltage should be 9V-9,5V at maximum and should be adjusted below 1V.

### 4- Peaking or sharpness adjustment

Adjust the voltage at PIN14 of IC TDA8362 to 3.2V + 0,1V - 0,2V with P3 potentiometer. The RGB output signals at TDA8362 should have the same amplitude for cross-hatch test pattern.

### 5- Geometrie adjustments

Adjust the picture geometrie as follows;
with P1 horizontal position
with P104 vertical position
with P105 vertical amplitude
with P106 vertical linearity

### 6- East-west adjustments

Adjust the east west correction circuit as follows
with P101 trapez correction
with P102 horizontal amplitude
with P103 pin cushion correction

### 7- White Balance and Screen Adjustment

Turn the potentiometres P801, P802, P803, P805 to maximum. Adjust colour and contrast controls to minimum and brightness to medium level. Adjust the screen potentiometer to the level where flyback lines disappear while the screen is dark.
Adjust the white balance for high luminance level with P801 and P802 potentiometers, for low luminance level, with P803 and P805 potentiometer.

### 8- Stereo/Nicam Module Adjustment

Apply a stereo signal with L, 3kHz and R, 1kHz to the set. Turn the L302 coil upwards and observe the distortion on audio signal.
Turn the L302 coil downwards, adjust the voltage to 2,5±V 0,1V at PIN 23 of IC302 while observing the 3kHz and 1kHz signals at audio output.

## THE VALUES WILL BE PRESET ACCORDING TO THE TUBES:

**White adjustment 9300 K (0)**
**High Light 60 Nits Low Light 6 Nits**

**1-) IRICO TUBE :**

| For a PAL Broadcast: | | For a NTSC Broadcast: | | RGB Values: | |
|---|---|---|---|---|---|
| VER. AM. | :15 | VER. AM. | :27 | R-Gain | :50 |
| VER. POS. | :03 | VER. POS. | :04 | B-Gain | :55 |
| VER. LIN. | :08 | VER. LIN. | :08 | G-Gain | :45 |
| HOR. POS. | :37 | HOR. POS. | :37 | R-DC | :45 |
| | | | | G-DC | :35 |

**2-) PHILIPS TUBE :**

| For a PAL Broadcast: | | For a NTSC Broadcast: | | RGB Values: | |
|---|---|---|---|---|---|
| VER. AM. | :16 | VER. AM. | :26 | R-Gain | :50 |
| VER. POS. | :02 | VER. POS. | :04 | B-Gain | :55 |
| VER. LIN. | :10 | VER. LIN. | :10 | G-Gain | :45 |
| HOR. POS. | :37 | HOR. POS. | :37 | R-DC | :45 |
| | | | | G-DC | :35 |

**3-) LG TUBE :**

| For a PAL Broadcast: | | For a NTSC Broadcast: | | RGB Values: | |
|---|---|---|---|---|---|
| VER. AM. | :19 | VER. AM. | :28 | R-Gain | :50 |
| VER. POS. | :03 | VER. POS. | :04 | B-Gain | :55 |
| VER. LIN. | :08 | VER. LIN. | :08 | G-Gain | :45 |
| HOR. POS. | :36 | HOR. POS. | :36 | R-DC | :45 |
| | | | | G-DC | :35 |

**1-) SAMSUNG TUBE : 20"**

| For a PALI Broadcast: | | For a NTSC Broadcast: | | RGB Values: | |
|---|---|---|---|---|---|
| VER. AM. | :28 | VER. AM. | :45 | R-Gain | :50 |
| VER. POS. | :01 | VER. POS. | :03 | B-Gain | :55 |
| VER. LIN. | :33 | VER. LIN. | :33 | G-Gain | :45 |
| HOR. POS. | :45 | HOR. POS. | :45 | R-DC | :45 |

**2-) LG TUBE : 20"**

| For a PAL Broadcast: | | For a NTSC Broadcast: | | RGB Values: | |
|---|---|---|---|---|---|
| VER. AM. | :25 | VER. AM. | :40 | R-Gain | :50 |
| VER. POS. | :03 | VER. POS. | :05 | B-Gain | :55 |
| VER. LIN. | :15 | VER. LIN. | :15 | G-Gain | :45 |
| HOR. POS. | :42 | HOR. POS. | :42 | R-DC | :45 |

These are the main values. Geometry and white adjustments will be corrected according to standarts by entering the service mode when needed.

## DC ELECTRICAL CHARACTERISTICS

| Symbol | Parameter | Test Conditions | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $I_{IL}$<br>$I_{IH}$ | Input Leakage Current | AFC Pin<br>$V_{IH}$= $V_{DD}$<br>$V_{IL}$= $V_{SS}$<br>$V_{IH}$ = 12.0V | -1 | | 1<br>40 | µA |
| $I_{OH}$ | Output Leakage Current | DA0-DA5, PA4-PA5, PC0-PC7, O0, O1<br>$V_{OH}$ = $V_{DD}$ | | | 10 | µA |
| $I_{OH}$ | Output Leakage Current High Voltage | DA0-DA5, PA4-PA7, PC4-PC7, O0, O1<br>$V_{OH}$ = 12V | | | 40 | µA |
| $I_{DD}$ | Supply Current RUN Mode | $f_{OSC}$ = 8MHz, ILoad= 0mA<br>$V_{DD}$= 6.0V | | 6 | 16 | mA |
| $I_{DD}$ | Supply Current WAIT Mode | $f_{OSC}$= 8MHz, ILoad= 0mA<br>$V_{DD}$= 6V | | 3 | 10 | mA |
| $I_{DD}$ | Supply Current at transition to RESET | $f_{OSC}$= Not App,<br>ILoad= 0mA<br>$V_{DD}$= 6V | | 0.1 | 1 | mA |
| $V_{ON}$ | Reset Trigger Level ON | RESET Pin | | | 0.3x$V_{DD}$ | V |
| $V_{OFF}$ | Reset Trigger Level OFF | RESET Pin | 0.8x$V_{DD}$ | | | V |
| $V_{TA}$ | Input Level Absolute Tolerance | A/D AFC Pin<br>$V_{DD}$= 5V | | | ± 200 | mV |
| $V_{TR}$ | Input Level Relatice Tolerance (1) | A/D AFC Pin<br>Relative to other levels<br>$V_{DD}$= 5V | | | ± 100 | mV |

**Note** 1. Not 100% Tested

## AC ELECTRICAL CHARACTERISTICS

(TA = 0 to +70°C, $f_{OSC}$=8MHz, $V_{DD}$=4.5 to 6.0V unless otherwise specified)

| Symbol | Parameter | Test Conditions | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $t_{WRES}$ | Minimum Pulse Width | RESET Pin | 125 | | | ns |
| $t_{OHL}$ | High to Low Transition Time | PA6, PA7<br>$V_{DD}$ = 5V, CL = 100pF (2) | | 100 | | ns |
| $t_{OHL}$ | High to Low Transition Time | DA0-DA5, PB0-PB6, OSD Outputs, PC0-PC7<br>$V_{DD}$ = 5V, CL = 100pF | | 20 | | ns |
| $t_{OLH}$ | Low to High Transition Time | PB0-PB6, PA0-PA3, OSD Outputs, PC0-PC3<br>$V_{DD}$ = 5V, CL = 100pF | | 20 | | ns |
| $f_{DA}$ | D/A Converter Repetition Frequency (1) | | | 31.25 | | kHz |
| $f_{SIO}$ | SIO Baudrate (1) | | | 62.50 | | kHz |
| $t_{WEE}$ | EEPROM Write Time | $T_A$ = 25°C One Byte | | 5 | 10 | ms |
| Endurance | EEPROM WRITE/ERASE Cycles | $Q_A$ $L_{OT}$ Acceptance Criteria | 300,000 | > 1 million | | cycles |
| Retention | EEPROM Data Retention (4) | $T_A$ = 25°C | 10 | | | years |
| $C_{IN}$ | Input Capacitance (3) | All Inputs Pins | | | 10 | pF |
| $C_{OUT}$ | Output Capacitance (3) | All Outputs Pins | | | 10 | pF |
| COSCin, COSCout | Oscillator Pins Internal Capacitance (3) | | | 5 | | pF |
| COSDin, COSDout | Oscillator Pins External Capacitance (3) | Recommended | 15 | | 25 | pF |

**Notes:**

1. A clock other than 8MHz will affect the frequency response of those peripherals (D/A, and SPIs) whose clock is derived from the system clock.
2. The rise and fall times of PORT A have been increased in order to avoid current spikes while maintaining a high drive capability
3. Not 100% Tested
4. Based on extrapolated data

## FUNCTIONAL DESCRIPTION

### 1 - DEFLECTION CIRCUIT

**Note :** [X,Y] : line number referred to the internal line counter numbering

- Fully integrated synch. separator, with a low pass filter, a black level alignment of the Y/CVBS input, a slicing level at 2/3,1/3 of the sync. pulse amplitude.
- Frame sync. pulse locked on 2 $f_H$ frequency to perfect interlace.
- 500kHz VCO with an external ceramic resonator.
- Two phase locked loops
  - the first PLL locks the VCO on the video signal frequency,
  - the second PLL compensates the line transistor storage time.
- Three time constants for the first PLL.
  - the long time constant is used for normal operation
  - the short time constant is automatically used during the frame retrace and in search mode of VCR when the frame pulse is outside [258,264] and [309,314].
  - very long time constant when no video recognition

  Time constants in normal operation (automatic selection of time constants) :

  50Hz input signal :
  - short time constant : [306, 21]
  - long time constant : the rest of the field
  - inhibition of the first PLL : the first locked loop is opened from line 309 to line 4.5 (or 314) in 50Hz mode.
  - the time constants values are chosen by means of external components.
  - possibility to force the short time constant through the bus.
  - possibility to force the very long time constant through the bus.
- Video identification : coincidence detector between the line synchro top and a line frequency window from the first PLL. The video identification status is available in the output register of the $I^2C$ bus decoder.
- Generation of burst gate pulses and line frequency signals from the first PLL to drive the chroma and video circuits. The burst gate pulse is also sent to the sandcastle generator.
- Frame synchro window : [248, 352] catching
- Field frequency selection windows : [288, 352] 50Hz mode selection window
- frame blanking pulse : from line 0 to 21 in 50Hz mode
- Vertical output pulse is 10.5 lines long.
- Horizontal output pulse : 28µs line pulse on an open collector output;
- Start up circuit : the horizontal output is at a high level when $V_{CC}$ increases from 0 to 6.8V. On shutting down, horizontal pulses are disabled when $V_{CC}$ is below 6.2V.
- Soft-start circuit : the duty cycle of the horizontal output is 78 % (Thigh/(Thigh + TLow)) when $V_{CC1}$ is lower than (0.75 x $V_{CC2}$), during the rising time.
  During the falling time, a 78% duty cycle HOUT pulse is provided when $V_{CC1}$ is lower than (0.60 x $V_{CC2}$).
- Possibility to disable the horizontal output pulse through the bus (force a high level on HOUT).
- Horizontal position adjustment controlled by bus.
- Bus controlled output voltage to adjust the vertical amplitude; this voltage permits to adjust the slope of the vertical sawtooth generated by the external frame booster.
- Bus controlled vertical position ; the high level of the vertical pulse permits to adjust the vertical position.
- Bus controlled 4/3-16/9 selection : the low level of the vertical pulse is 0.1V when 16/9 is selected, 2V when 4/3 is selected.
- Combined flyback input and sandcastle output (Pin 37).
  Two thresholds on LFB/SCO Pin : The lowest threshold (0.7V) permits to extract the line blanking pulse; the highest threshold (2V) permits to extract the line pulse for PLL2.
  The sandcastle signal at Pin 37 is used to control the external baseband chroma delay line.

## FUNCTIONAL DESCRIPTION (continued)

### 2 - FILTERS

- Integrated trap filter :

$$Q = \frac{1}{\frac{f_o}{f_{-3dB}} - \frac{f_{-3dB}}{f_o}}$$

Q = 1.7 at sharp. min
Q = 3.0 at sharp. max

Center frequency : - 4.43MHz for PAL
- 4.25MHz, for SECAM ($f_{-3dB}$ = 3MHz ; -20dB rejection between 4.1MHz and 4.4MHz)

- Integrated chroma bandpass :
  Q = 3.5
  Center frequency : 4.43MHz, 3.58MHz
- Integrated cloche filter for SECAM :
  Q = 16
  Center frequency : 4.286MHz
- Integrated delay line :
  Bandwidth = 8MHz
- Integrated low pass filter for deflection part.
- All filters are tuned with a reference phase locked loop.



The PLL consists of a lowpass filter, a phase comparator, a loop filter (with an external capacitor). The reference signal is the continuous carrier wave from the VCO (4.43MHz).
The PLL adjusts the center frequency of the lowpass so that it is equal to the reference signal. The tuning voltage of the PLL is used to adjust all other filters.
The cloche filter is fine tuned with a second PLL operating during frame retrace.

## 3 - VIDEO CIRCUIT

- 2 RGB inputs : RGB (OSD) input has priority against the RGBext. Maximum contrast on RGB (OSD). -10dB range contrast control on RGBext. Possibility to disable the RGBext insertion through the bus.
- Oversize blanking capability on FB(OSD)(Pin15) input. The RGB ouputs will be blanked when the voltage on Pin 15 will exceed the second threshold at 1.9V (blanking threshold) : the whole field is blanked but not the inserted cut-off pulses. The OSD insertion threshold is 0.7V.
- Automatic cut-off current loop : 2V cut-off range. Sequential cut-off current measurement during the three lines after the frame blanking signal. Leakage current measurement during the frame blanking, memorization on an internal capacitor.
- Warm up detector.
- Beam current limiter DC voltage input. The beam current limiter control voltage will act on contrast first, then the brightness will be decreased when contrast attenuation reaches -5dB.
- Bus control of the red, green and blue channel gain (White point adjustment)
- Bus control of the red and green DC levels (black point adjustment)
- PAL and SECAM matrix).
- Switch-off of the trap filter in SVHS mode.
- Bus controlled contrast on luminance (20dB range)
- Bus controlled saturation (50dB range)
- Bus controlled brightness : 40% range at maximum contrast.
- Bus controlled sharpness (peaking) ; sharpness active in PAL standard only.
- Noise coring function on sharpness.

## FUNCTIONAL DESCRIPTION (continued)

## 4 - CHROMA CIRCUIT

### 4.1 - PAL/SECAM Decoders

- SVHS inputs ; bus controlled SVHS mode.
- 30dB range ACC
- Use of an external base band delay line (STV2180 recommended)
- Automatic standard identification, with possibility to force the standard through the bus.

### 4.2 - PAL Decoder

- ACC done by peak detector on synchronous demodulation of the burst
- Fully integrated killer functions.
- VCO using two standard crystals : 4.43MHz and 3.58MHz.
  3.58MHz crystal is temporarily requested on this version to achieve proper standard identification.

  XTAL SPECIFICATION :
  Frequency :
  4.433619MHz (PAL/SECAM)

  Vibration mode : Fondamental, series resonance (no serial capacitor)
  Motional capacity : 13fF ±3fF
  Resonance resistance : < 70Ω
  Shunt capacitance : < 7pF
  Spurious response : No resonance at $3*f_o$ ±3kHz
- $0^o$ and $\pm 90^o$ demodulation angles for PAL

### 4.3 - SECAM Decoder

- ACC
- Fully integrated killer
- Two integrated discriminators with two PLL
- Integrated deemphasis

### 4.4 - Standard Identification

- Sequential identification.
- 3 identification sequences : XTAL1 (4.43MHz) mode to identify PAL, XTAL2 (3.58MHz) mode not used, SECAM mode (XTAL1 selection).
- PAL priority
- the SECAM mode is locked after two identified SECAM sequences
- the SECAM mode can be selected in 50Hz only
- Blanking of the (R-Y) and B-Y) outputs during color search mode.

## 5 - OTHER FUNCTIONS : IF CONTROLS

### 5.1 - Volume Control and Mute

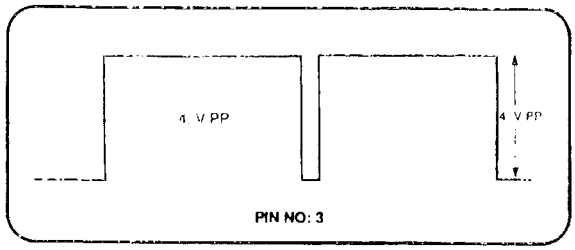
The volume control voltage range on Pin 10 is from 0.5V to 5V. A low voltage on Pin 10 (below 0.2V) will mute the FM demodulator of the IF circuit STV8224. It will put the volume at the minimum level and thus there will be no sound either in TV mode or SCART mode.

The volume control voltage and the mute level are controlled by the bus.

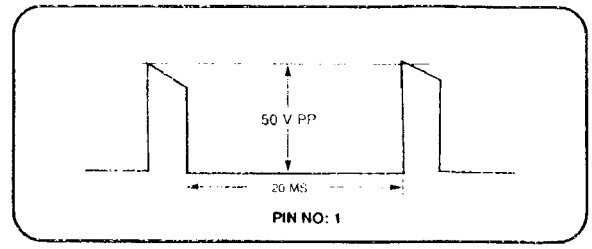
### 5.2 - IF Standard and TV/SCART Mode Selection

The selection of IF standard (positive or negative vision modulation) and the TV/SCART mode is controlled by the bus. The selection is converted in four voltages on Pin 21.
The lowest voltage selects the TV mode and the NEGATIVE vision modulation.
The highest voltage (open collector output with internal pull-up resistor to $V_{CC}$) selects the SCART mode and the NEGATIVE vision modulation.
The two other intermediate voltages select either TV mode and POSITIVE vision modulation or SCART mode and POSITIVE vision modulation.

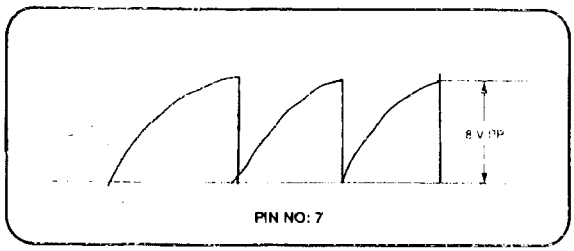
## IC501 TDA 8174A
## OSCILLOSCOPE WAVE FORMS



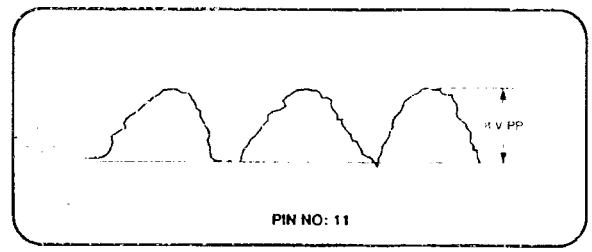

PIN NO: 3




PIN NO: 1

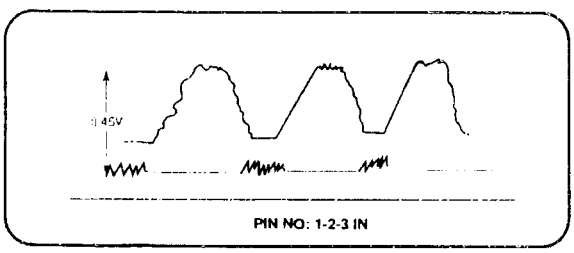



PIN NO: 7

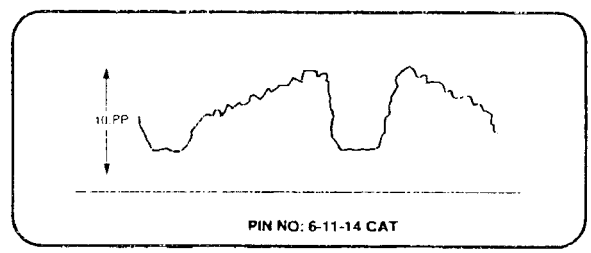



PIN NO: 11

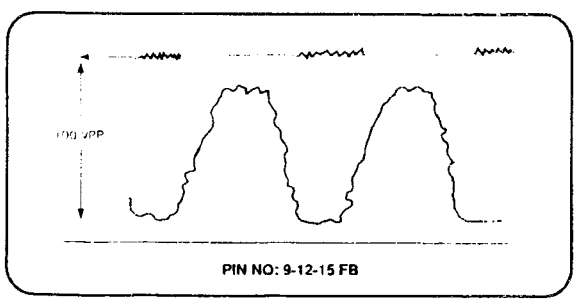
## IC801 STV5112
## OSCILLOSCOPE WAVE FORMS




PIN NO: 1-2-3 IN

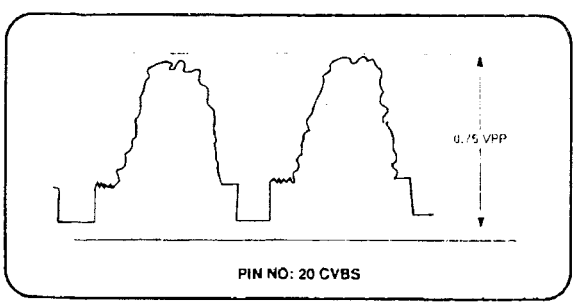



PIN NO: 6-11-14 CAT



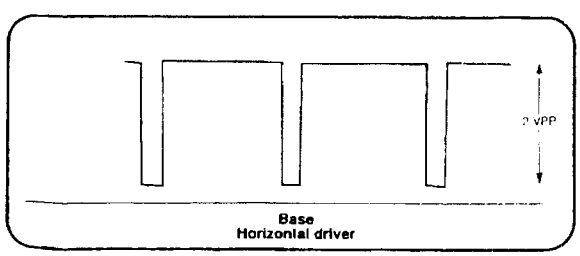

PIN NO: 9-12-15 FB

## IC151 STV2116A
## OSCILLOSCOPE WAVE FORMS

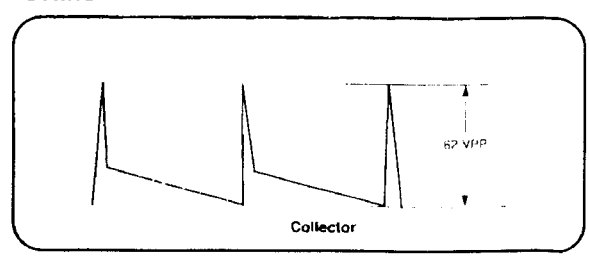



PIN NO: 20 CVBS

## T551 TRN BC618
## OSCILLOSCOPE WAVE FORMS

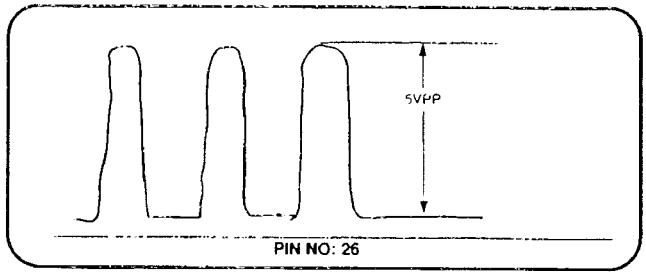



Base
Horizontal driver

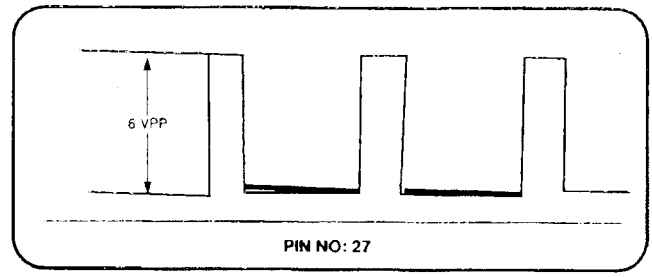



Collector

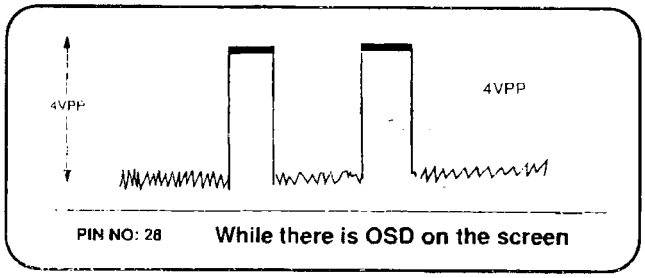
## IC401 ST6387
## OSCILLOSCOPE WAVE FORMS



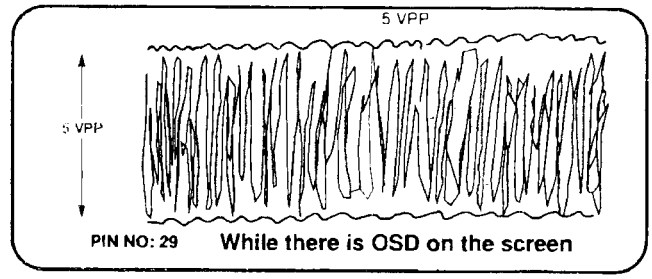

PIN NO: 26



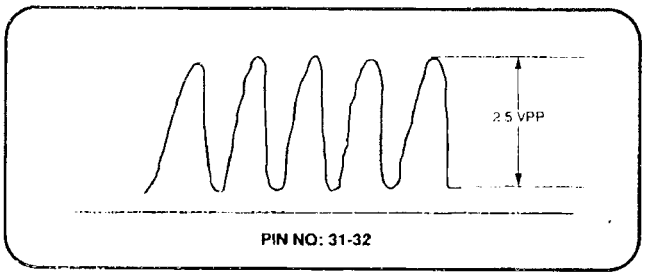

PIN NO: 27



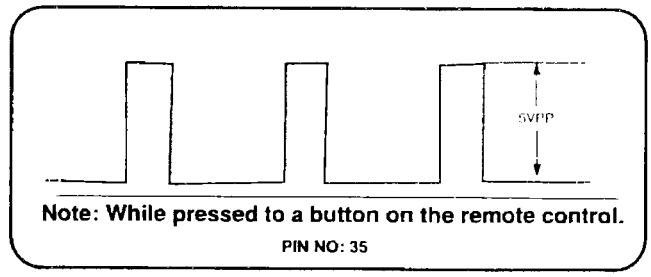

PIN NO: 28 While there is OSD on the screen




PIN NO: 29 While there is OSD on the screen

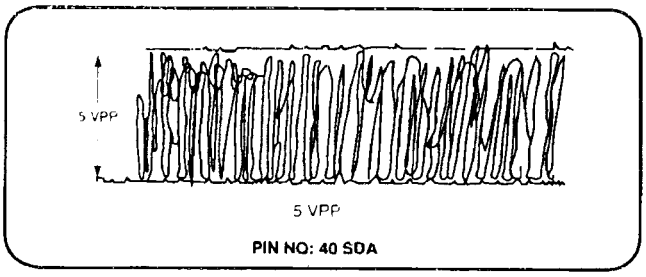



PIN NO: 31-32

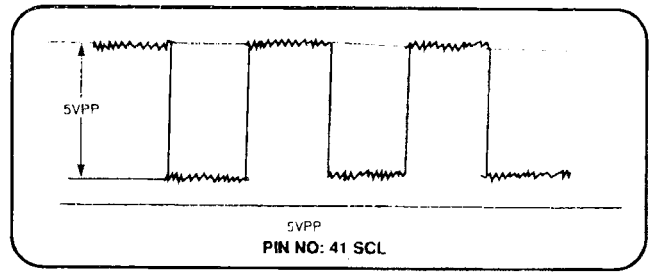



Note: While pressed to a button on the remote control.

PIN NO: 35

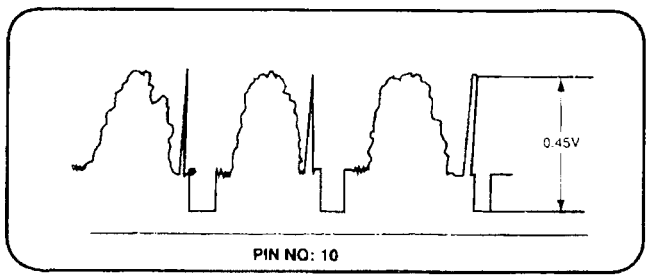



PIN NO: 40 SDA

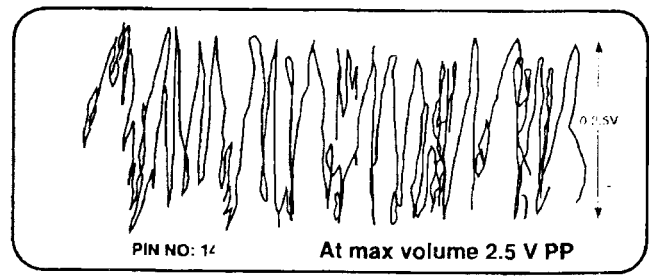



PIN NO: 41 SCL

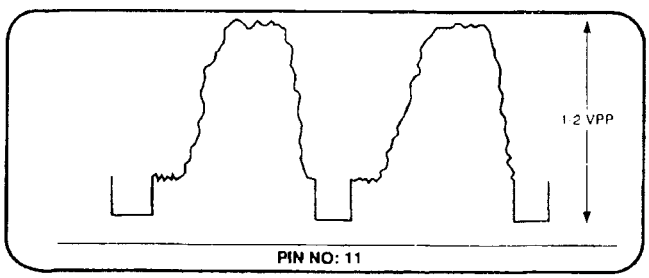
## IC101 STV8223B
## OSCILLOSCOPE WAVE FORMS




PIN NO: 10



PIN NO: 14 At max volume 2.5 V PP




PIN NO: 11

## PIN VOLTAGES OF INTEGRATED CIRCUITS

### 1. SWITCH-MODE CIRCUIT AND IC901 PIN VOLTAGES

| IC901 Pin No. | Stand-By Mode | | | Operation Mode | | |
|---|---|---|---|---|---|---|
| | DC (V) | AC | NOTES | DC (V) | AC | NOTES |
| 1 | 12V | | | 12.7 | | |
| 2 | 12.4 | | | 12.2 | | |
| 3 | 0.2 | | | 1.7 | | |
| 4 | – | | | – | | |
| 5 | 2.8V | | | 3.1V | | |
| 6 | – | | | – | | |
| 7 | – | | | – | | |
| 8 | 0.1 | | | 0.1 | | |
| 9 | – | | | – | | |
| 10 | 2.6 | | | 2.6 | | |
| 11 | 2.4 | | | 2.4 | | |
| 12 | 1.3 | | | 0.5 | | |
| 13 | 1.8 | | | 2.7 | | |
| 14 | 2.5 | | | 2.5 | | |
| 15 | 2.5 | | | 2.5 | | |
| 16 | 2.5 | | | 2.5 | | |
| D906 | – | | | 13V | | |

**Note1:** Before these measurements, check if there is +300 VDC ~+330 DVC at pin 1 of TR901.

**Note2:** Be careful while making measurements never use cold chassis while the measurements are being made.

**Note3:** Use measurement instrument that has high internal impedance.

### 2- PIN VOLTAGES OF "STV8223B" IC101 IF FREQUENCY IC.

| Pin No. | | | NOTES |
|---|---|---|---|
| | DC (V) | AC (V) | |
| 1 | 1.9 | | |
| 2 | 4.7 | | |
| 3 | 2.5 | | |
| 4 | 0 | | |
| 5 | 5.9 | | |
| 6 | 5.9 | | |
| 7 | 4.8 | | |
| 8 | 3.8 | | |
| 9 | 4.5 | | |
| 10 | 2.3 | | |
| 11 | 2.5 | | |
| 12 | 1.8 | | |
| 13 | 0.4 | | |
| 14 | 4.4 | | |
| 15 | 4.5 | | |
| 16 | 4.5 | | |
| 17 | 9.2 | | |
| 18 | 0 | | |
| 19 | 2.9 | | |
| 20 | 2.9 | | |
| 21 | 3.3 | | |
| 22 | 4.0 | | |
| 23 | 2.3 | | |
| 24 | 0.6 | | |

# PIN VOLTAGES OF TRANSISTORS

## 1- Tuner Band Control Transistors:

| Transistor Name | UHF is in use | | | UHF out of use | | | UHF is in use | | | UHF out of use | | | UHF is in use | | | UHF out of use | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B(V) | E(V) | C(V) | B(V) | E(V) | C(V) | B(V) | E(V) | C(V) | B(V) | E(V) | C(V) | B(V) | E(V) | C(V) | B(V) | E(V) | C(V) |
| T452 | 4 | 4.7 | 4.7 | 4.5 | 4.7 | 0 | | | | | | | | | | | | |
| T453 | | | | | | | 4 | 4.7 | 4.7 | 4.7 | 4.7 | 0 | | | | | | |
| T454 | | | | | | | | | | | | | 4 | 4.7 | 4.7 | 4.7 | 4.7 | 0 |

## 2- Varicap Voltage Control Transistor

| Transistor Name | | VHF1 | | VHF3 | | UHF | |
|---|---|---|---|---|---|---|---|
| | | Start of Band | End of Band | Start of Band | End of Band | Start of Band | End of Band |
| T451 | E (V) | 0 | 0 | 0 | 0 | 0 | 0 |
| | B (V) | 0.6 | 0 | 0.6 | 0 | 0.6 | 0 |
| | C (V) | 0 | 29 | 0 | 29 | 0 | 29 |

## 3- LED Switch transistor

| Transistor Name | TV is in Stand- By Mode | | | TV is Operating | | |
|---|---|---|---|---|---|---|
| | E (V) | B (V) | C (V) | E (V) | B (V) | C (V) |
| T402 | 1.1 | 0.5 | 0 | 5 | 2.2 | 0 |

## 4- Reset transistor

| Transistor Name | TV is in Stand- By Mode | | | TV is Operating | | |
|---|---|---|---|---|---|---|
| | E (V) | B (V) | C (V) | E (V) | B (V) | C (V) |
| T403 | | | | 4.36 | 3.72 | 4.35 |

## 5- Vertical Output IC (K501) Control Transistors

| Transistor No | TV is Normal | | | Geometry Adjustments are destroyed or there is a defect. | | | NOTES |
|---|---|---|---|---|---|---|---|
| | E (V) | B (V) | C (V) | E (V) | B (V) | C (V) | |
| T 501 | 0 | 0.6 | 0 | | | | Measurements are made when the geometry adjustments on the screen are exactly right. |
| T 502 | 5.2 | 5.7 | 11.5 | | | | |

## 6- Horizontal Output Driver Transistor

| Transistor No | E (V) | B (V) | C AC (V) | NOTES |
|---|---|---|---|---|
| T551 | – | 0.3 | 9 | The measurement that is made while the TV is in normal operation |

## 7- CVBS Driver and Impedance Adapter

| Transistor No | E (V) | B (V) | C (V) | NOTES |
|---|---|---|---|---|
| T101 | 1.9 | 0.1.3 | – | |

## 8- External Scart CVBS, Video and Audio Input Control Transistors

| Transistor No | E (V) | B (V) | C (V) |
|---|---|---|---|
| **T131-BC848B External Sound Control** | 3.8 | 4.4 | 4.8 |
| **T130-BC848B External CVBS Control** | 1.8 | 2.5 | 4.8 |

**NOTE:** Voltages of T552-BU508DF1 transistor are not given here for safety of your measurement instruments.

## 9-"Pop" Sound Cutting Circuit While The TV is Being Switched On-Off

| Transistor No | E (V) | B (V) | C (V) | NOTES |
|---|---|---|---|---|
| T302 | 0 | 0.65 | 0 | |
| T301 | 0 | 0 | 0 | |

| 5- PIN VOLTAGES OF SECAM CONVERTER AND DELAY LINE "STV2180A" IC. | | | | | |
|---|---|---|---|---|---|
| Pin No. | | | Pin No. | | |
| | DC (V) | AC (V) | | DC (V) | AC (V) |
| 1 | | 0 | 8 | | 0 |
| 2 | | 2.5 | 9 | | 1.1 |
| 3 | | 3.1 | 10 | | 6.8 |
| 4 | | 3.1 | 11 | | 9.0 |
| 5 | | 3.9 | 12 | | 0 |
| 6 | | 0.6 | 13 | | 0 |
| 7 | | 0 | 14 | | 2.5 |

| 6- PIN VOLTAGES OF "STV5112" IC 801 RGB OUTPUT IC. | | | | |
|---|---|---|---|---|
| Pin No. | Function | | | NOTES |
| | | DC (V) | AC (V) (By oscilloscope) | |
| 1 | Blue Input | 2.4 | | |
| 2 | Vcc (16 V) | 9.0 | | |
| 3 | Green Input | 2.5 | | |
| 4 | Red Input | 2.5 | | |
| 5 | VDD (+185 V Input) | +185 | | |
| 6 | Red Cathode Current | 3.0 | | |
| 7 | Red Output | 107 | | Changes according to the picture |
| 8 | Chassis (Ground) | - | | |
| 9 | Red Feedback | 110 | | Changes according to the picture |
| 10 | Green Output | 118 | | Changes according to the picture |
| 11 | Green Cathode Current | 2.1 | | |
| 12 | Green Feedback | 122 | | Changes according to the picture |
| 13 | Blue Output | 120 | | Changes according to the picture |
| 14 | Blue Cathade Current | 2.2 | | |
| 15 | Blue Feedback | 121 | | Changes according to the picture |

## 3- PIN VOLTAGES OF "ST6387" (IC401) CPU

| Pin No. | DC (V) | AC | Pin No. | DC (V) | AC) |
|---|---|---|---|---|---|
| 1 | 5.0 | | 22 | 0 | |
| 2 | 1.1 | | 23 | 0 | |
| 3 | 2.2 | | 24 | 0 | |
| 4 | 2.2 | | 25 | 0 | |
| 5 | 0.1 | | 26 | 0.9 | |
| 6 | 2.1 | | 27 | 0.2 | |
| 7 | 0 | | 28 | 4.9 | |
| 8 | 1.3 | | 29 | 4.9 | |
| 9 | 2.2 | | 30 | 0 | Stops while operating. |
| 10 | 4.9 | | 31 | – | |
| 11 | 0 | | 32 | – | |
| 12 | 0 | | 33 | 4.3 | |
| 13 | 4.9 | | 34 | 2.1 | |
| 14 | 4.9 | | 35 | 4.9 | |
| 15 | 4.9 | | 36 | 0 | |
| 16 | 4.9 | | 37 | 7.9 | |
| 17 | 4.7 | | 38 | 0.4 | |
| 18 | 4.7 | | 39 | 1.3 | |
| 19 | 9.2 | | 40 | 3.8 | |
| 20 | 0 | | 41 | 2.8 | |
| 21 | 0 | | 42 | 4.9 | |

## 4. PIN VOLTAGES OF (IC 151) "STV2116A" COLOUR AND RGB INPUT/OUTPUT IC.

| Pin No. | DC (V) | AC (V) | Pin No. | DC (V) | AC (V) |
|---|---|---|---|---|---|
| 1 | 0 | | 22 | 9.2 | |
| 2 | 8.3 | | 23 | 0 | |
| 3 | 3.8 | | 24 | 2.2 | |
| 4 | 4.8 | | 25 | 2.0 | |
| 5 | 3.5 | | 26 | 2.1 | |
| 6 | 3.8 | | 27 | 1.9 | |
| 7 | 2.8 | | 28 | 2.1 | |
| 8 | 4.6 | | 29 | 1.8 | |
| 9 | 0 | | 30 | 2.1 | |
| 10 | 0.6 | | 31 | 6.7 | |
| 11 | 0 | | 32 | 2.5 | |
| 12 | 1.5 | | 33 | 4.5 | |
| 13 | 1.4 | | 34 | 4.5 | |
| 14 | 1.4 | | 35 | 5.4 | |
| 15 | 0 | | 36 | 2.9 | |
| 16 | 1.8 | | 37 | 0.6 | |
| 17 | 1.6 | | 38 | 2.7 | |
| 18 | 1.6 | | 39 | 2.9 | |
| 19 | 0 | | 40 | 5.7 | |
| 20 | 4.0 | | 41 | 5.6 | |
| 21 | 0 | | 42 | 9.1 | |

## 7- PIN VOLTAGES OF "STV5347" TELETEXT IC.

| Pin No. | DC (V) | AC (V) | Pin No. | DC (V) | AC (V) |
|---|---|---|---|---|---|
| 1 | 0.3 | | 15 | 0 | |
| 2 | 0 | | 16 | 2.4 | |
| 3 | 4.9 | | 17 | 3.7 | |
| 4 | 0 | | 18 | 0 | |
| 5 | 4.5 | | 19 | 4.9 | |
| 6 | 0 | | 20 | 0 | |
| 7 | 0 | | 21 | 4.9 | |
| 8 | 0.4 | | 22 | 4.9 | |
| 9 | 0.7 | | 23 | 2.4 | |
| 10 | 0.8 | | 24 | — | Can not be measured passing channel picture |
| 11 | 4.9 | | 25 | 0 | |
| 12 | 4.7 | | 26 | 0 | |
| 13 | 0.2 | | 27 | 0 | |
| 14 | 24 | | 28 | 1.2 | |

## 8- PIN VOLTAGES OF "TDA2822" (IC301) AUDIO OUTPUT IC.

| Pin No. | DC (V) | AC (V) | Pin No. | DC (V) | AC (V) |
|---|---|---|---|---|---|
| 1 | 0 | | 9 | 0 | |
| 2 | 0 | | 10 | 0 | |
| 3 | 0.5 | | 11 | 5.8 | |
| 4 | 0 | | 12 | 0 | |
| 5 | 0 | | 13 | 0 | |
| 6 | 5.8 | | 14 | 0.5 | |
| 7 | 0 | | 15 | 0.2 | |
| 8 | 12.8 | | 16 | 0 | |

## 9. VERTICAL OUTPUT STAGE AND "TDA8174A" (IC501) PIN VOLTAGES

| Pin No. | Function | Operation Mode | |
|---|---|---|---|
| | | DC (V) | AC (V) (By Oscilloscope) |
| 1 | Vert. Deflection Output | + 12V | |
| 2 | Output Stage Vs | 25V | |
| 3 | Trigger Input | 5.2 | |
| 4 | Amplitude | 4.6 | |
| 5 | Vertical Reference | 1.5 | |
| 6 | Chassis | | |
| 7 | Ramp Generator | 4.6 | |
| 8 | Vert. Amp. Driver | 5.6 | |
| 9 | Inverting Input | 4.4 | |
| 10 | Mains Voltage | 25 | |
| 11 | Flyback Generator | 1.1 | |

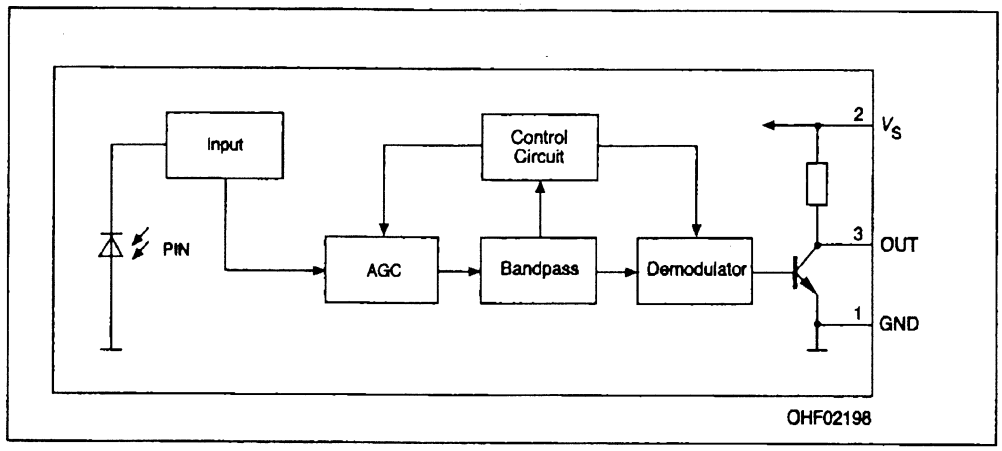
# SFH 506

## IR-RECEIVER / DEMODULATOR DEVICE

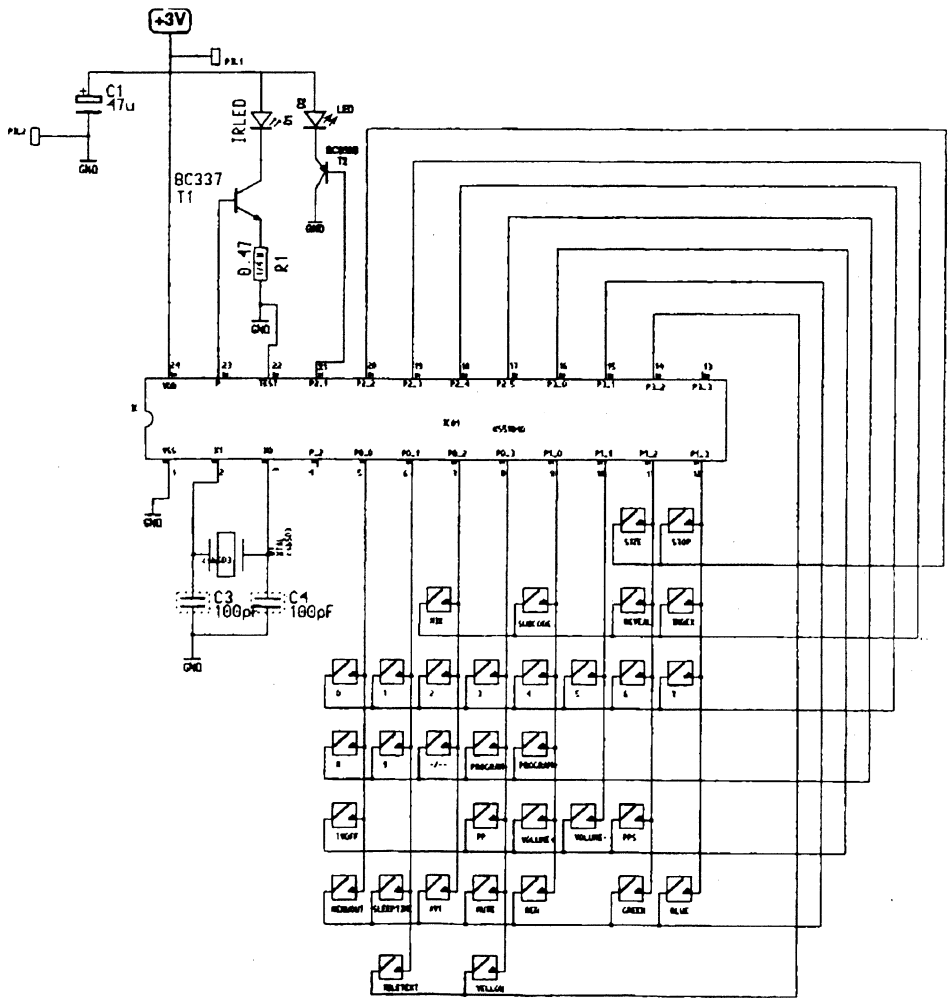
### FEATURES

- Photodiode with hybride integrated circuit
- Available for several Carrier frequencies
- Black epoxy resin , daylight filter optimized for 950 nm
- High immunity against ambient light
- Low power consumption
- 5 V supply voltage
- High sensitivity (internal shield case )
- TTL and CMOS compatibility
- Continuous transmission possible ( $t_{pi}$ / $T \leq 0.4$ )

### Block Diagram




## REMOTE CONTROL CIRCUIT DIAGRAM



## SERVICE ADJUSTMENTS

### 1-Supply Voltage adjustment

Connect a digital voltmeter to the anode of D950 and set the screen potentiometer to minimum. Adjust the main supply voltage +B with P901 to following voltage values;

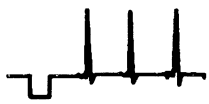
113V DC for 14" IRICO tube,
107V DC for 14" PHILIPS tube,
104V DC for 14" LG tube,
121V DC for 20" SAMSUNG tube,
117V DC for 20" LG tube,
113V DC for 21" LG tube,
119V DC for 21" SAMSUNG tube,

Adjust the screen potentiometer to the level where a picture is just visible. Adjust the focus potentiometer.

### 2- AFC adjustment

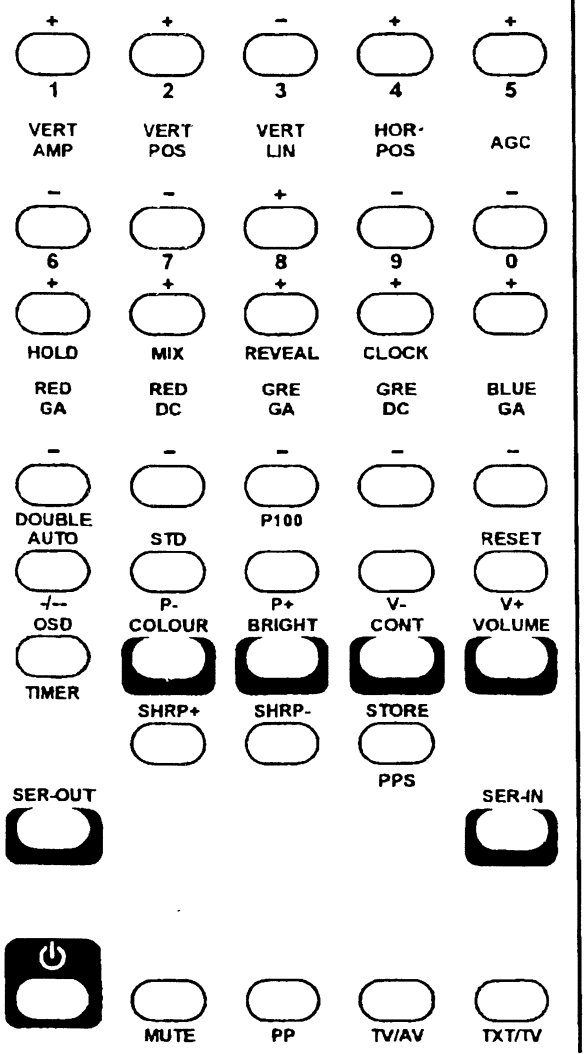
Press Yellow button then TVTX button to call the tuning table. Press Yellow button again to set the AFC to OFF. Apply a crosshatch pattern with 38.9 IF carrier to pins 1-2 of F105. Connect the oscilloscope to the video output pins of the scart connector. Adjust L101 until the waveform on the oscilloscope Fig 1 is visiable and the voltage at PIN 9 of IC 401 becomes 2,425 V + - 75mV. Video output level at scart output should be 2Vpp.

**Figure 1**



Set the AFC ON again in menu.

### SERVICE REMOTE CONTROL:




### 3- AGC adjustment

Apply a signal at CH32 with 60±dBuV level to the antenna input. Enter the Service Mode, using "Ser IN" button on service RC. Using "AGC" buttons adjust the voltage at the AGC pin of Tuner to 4 V + - 50mV DC. Press "PPS" to store the adjusted values.

### 4- Sharpness adjustment

Set the XY value (sharpness adjustment) to 4 by using 'SHRP + 'and' SHRP - 'buttons on service RC.

Apply an AV signal from Scart (Video in (20) and Audio in (2 and 6)) inputs of CHASSIS and then observe a clear picture and sound.

### 5- Geometry adjustment

Apply a FUBK or Philips test pattern.
For Vertical Linearity, use buttons "2" and "7".
For Vertical Position, use buttons "3" and "8".
For Vertical Amplitude, use buttons "1" and "6".
For Horizontal Position, use buttons"4" and "9".

There is no Horizontal width adjustment. If this adjustment is necessary this can be done changing the mains voltage ± 1V.

### 6- Screen adjustment

Set the TV to AV mode when Brightness (%55), Contrast (%80), and Color (%55) are at their stored values. Connect a digital voltmeter to PIN10 of IC801. Adjust the screen potentiometer by increasing the voltage from 0 to 105 ± 1V.

### 7- White balance adjustment

Apply a Gray Scale test pattern. There is no blue cut-off adjustment (low light) at white adjustment. Set the G-Gain value to 45 using"G-Gain+" and "G-Gain-" buttons. Then perform white adjustment by using,
Red high light increase/decrease (R-Gain +/-) buttons.
Blue high light increase/decrease (B-Gain +/-) buttons.
Red low light increase/decrease (R-DC +/-) buttons.
Green low light increase/decrease (G-DC +/-) buttons.

Set the colour system to "Auto" using "P-/STD" button.

OSD colour bars can be seen by using "Timer/OSD" for OSD control.

**Always, use "SER.IN" button to enter the Servis Menu and "SER.OUT" button to exit the Servis Menu. In order to store press "STORE" button to store above adjusted values.**

**See attached table for Geometry and White Balance settings.**

## SERVICE ADJUSTMENTS

### 1-Supply Voltage adjustment

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113V DC for 14" IRICO tube,
107V DC for 14" PHILIPS tube,
104V DC for 14" LG tube,
121V DC for 20" SAMSUNG tube,
117V DC for 20" LG tube,
113V DC for 21" LG tube,
119V DC for 21" SAMSUNG tube,

Adjust the screen potentiometer to the level where a picture is just visible. Adjust the focus potentiometer.

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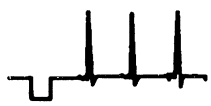
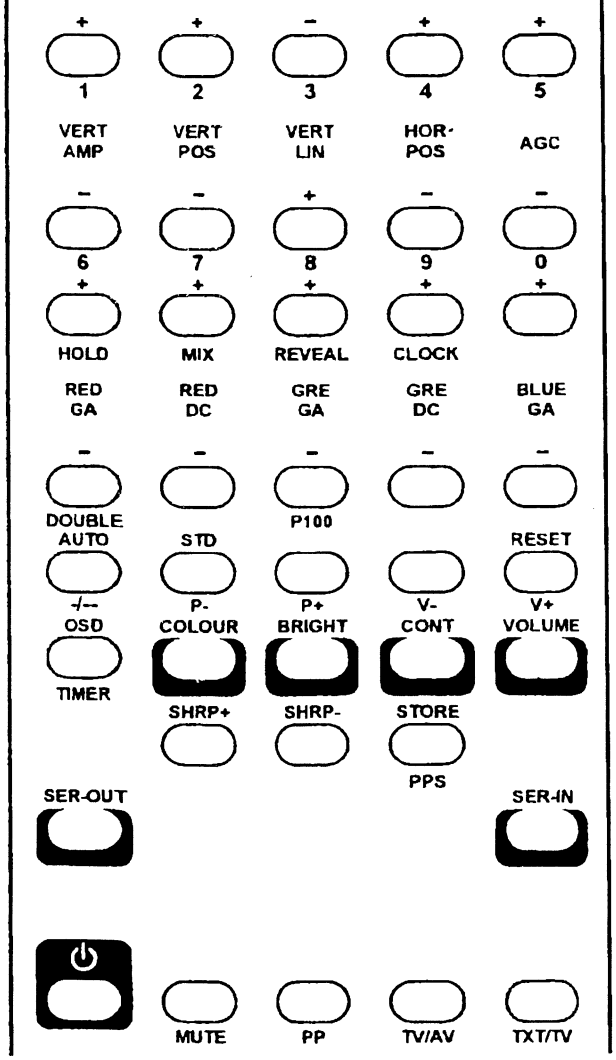
**Figure 1**



Set the AFC ON again in menu.

### SERVICE REMOTE CONTROL:




### 3- AGC adjustment

Apply a signal at CH32 with 60±dBuV level to the antenna input. Enter the Service Mode, using "Ser IN" button on service RC. Using "AGC" buttons adjust the voltage at the AGC pin of Tuner to 4 V + - 50mV DC. Press "PPS" to store the adjusted values.

### 4- Sharpness adjustment

Set the XY value (sharpness adjustment) to 4 by using 'SHRP + 'and' SHRP - 'buttons on service RC.

Apply an AV signal from Scart (Video in (20) and Audio in (2 and 6)) inputs of CHASSIS and then observe a clear picture and sound.

### 5- Geometry adjustment

Apply a FUBK or Philips test pattern.
For Vertical Linearity, use buttons "2" and "7".
For Vertical Position, use buttons "3" and "8".
For Vertical Amplitude, use buttons "1" and "6".
For Horizontal Position, use buttons"4" and "9".

There is no Horizontal width adjustment. If this adjustment is necessary this can be done changing the mains voltage ± 1V.

### 6- Screen adjustment

Set the TV to AV mode when Brightness (%55), Contrast (%80), and Color (%55) are at their stored values. Connect a digital voltmeter to PIN10 of IC801. Adjust the screen potentiometer by increasing the voltage from 0 to 105 ± 1V.

### 7- White balance adjustment

Apply a Gray Scale test pattern. There is no blue cut-off adjustment (low light) at white adjustment. Set the G-Gain value to 45 using"G-Gain+" and "G-Gain-" buttons. Then perform white adjustment by using,
Red high light increase/decrease (R-Gain +/-) buttons.
Blue high light increase/decrease (B-Gain +/-) buttons.
Red low light increase/decrease (R-DC +/-) buttons.
Green low light increase/decrease (G-DC +/-) buttons.

Set the colour system to "Auto" using "P-/STD" button.

OSD colour bars can be seen by using "Timer/OSD" for OSD control.

**Always, use "SER.IN" button to enter the Servis Menu and "SER.OUT" button to exit the Servis Menu. In order to store press "STORE" button to store above adjusted values.**

**See attached table for Geometry and White Balance settings.**

# ST6387

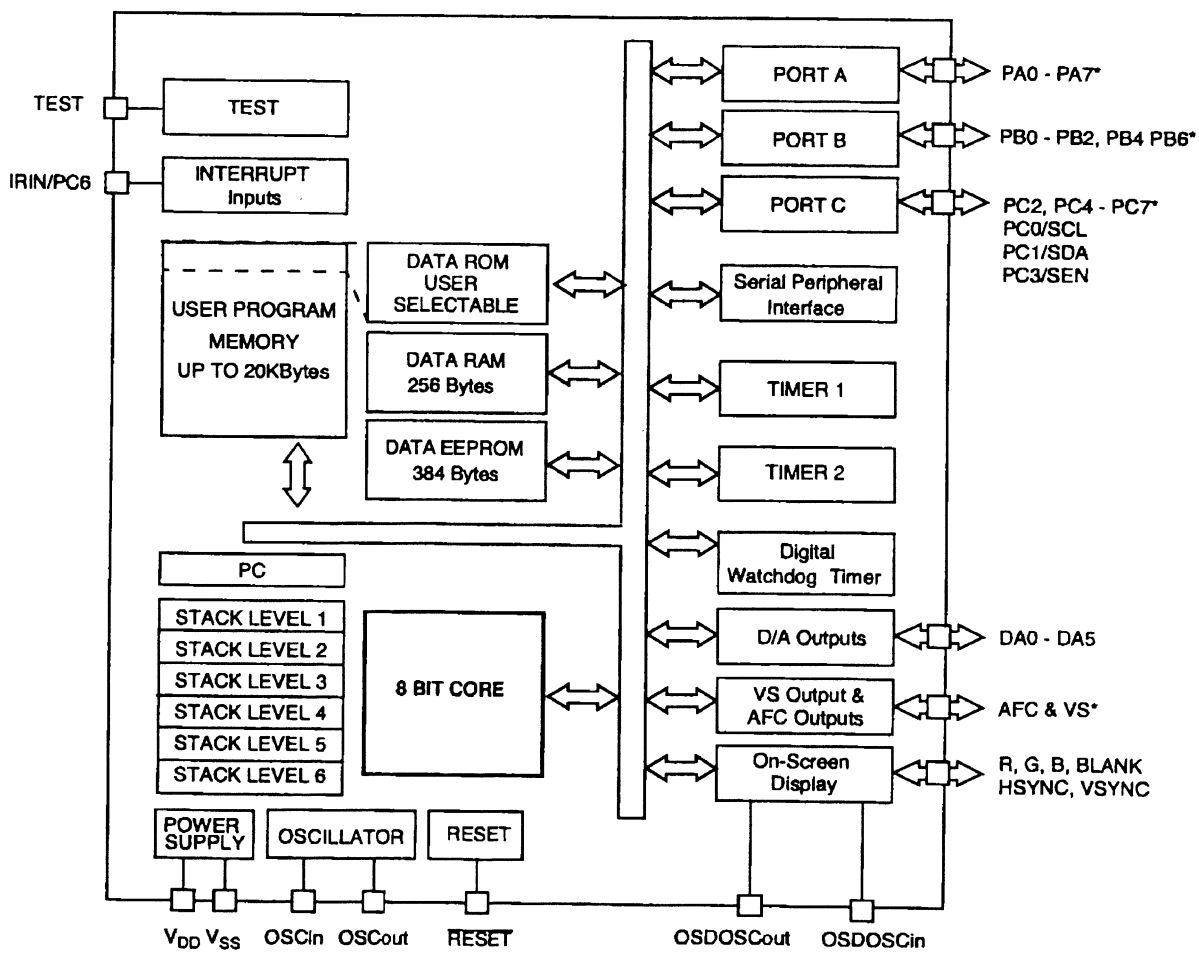
## 8-BIT MICROCONTROLLER WITH ON-SCREEN-DISPLAY FOR TV TUNING

- 4.5 to 6V supply operating range
- 8MHz Maximum Clock Frequency
- User Program ROM: up to 20140 bytes
- Reserved Test ROM: up to 340 bytes
- Data ROM: user selectable size
- Data RAM: 256 bytes
- Data EEPROM: 384 bytes
- 42-Pin Shrink Dual in Line Plastic Package
- Up to 22 software programmable general purpose Inputs/Outputs, including 2 direct LED driving Outputs
- Two Timers each including an 8-bit counter with a 7-bit programmable prescaler
- Digital Watchdog Function
- Serial Peripheral Interface (SPI) supporting S-BUS/ I 2 C BUS and standard serial protocols
- SPI for external frequency synthesis tuning
- 14 bit counter for voltage synthesis tuning
- Up to Six 6-Bit PWM D/A Converters
- AFC A/D converter with 0.5V resolution
- Five interrupt vectors (IRIN/NMI, Timer 1 & 2, VSYNC, PWR INT.)
- On-chip clock oscillator
- 5 Lines by 15 Characters On-Screen Display Generator with 128 Characters
- All ROM types are supported by pin-to-pin EPROM and OTP versions.

### Device Summary

| Device | ROM (Bytes) | RAM (Bytes) | EEPROM (Bytes) | AFC | VS | D/A | Colour Pins | EPROM Devices |
|---|---|---|---|---|---|---|---|---|
| ST6387 | 20K | 256 | 384 | Yes | Yes | 6 | 3 | ST63E87 |

### Block Diagram



## PIN DESCRIPTION

**$V_{DD}$ and $V_{SS}$.** Power is supplied to the MCU using these two pins. $V_{DD}$ is power and $V_{SS}$ is the ground connection.

**OSCin, OSCout.** These pins are internally connected to the on-chip oscillator circuit. A quartz crystal or a ceramic resonator can be connected between these two pins in order to allow the correct operation of the MCU with various stability/ cost trade-offs. The OSCin pin is the input pin, the OSCout pin is the output pin.

**RESET.** The active low RESET pin is used to start the microcontroller to the beginning of its program. Additionally the quartz crystal oscillator will be disabled when the RESET pin is low to reduce power consumption during reset phase.

**TEST.** The TEST pin must be held at $V_{SS}$ for normal operation.

**PA0-PA7.** These 8 lines are organized as one I/O port (A). Each line may be configured as either an input with or without pull-up resistor or as an output under software control of the data direction register. Pins PA4 to PA7 are configured as open-drain outputs (12V drive). On PA4-PA7 pins the input pull-up option is not available while PA6 and PA7 have additional current driving capability (25mA, $V_{OL}$:1V). PA0 to PA3 pins are configured as push-pull.

**PB0-PB2, PB4-PB6.** These 6 lines are organized as one I/O port (B). Each line may be configured as either an input with or without internal pull-up resistor or as an output under software control of the data direction register.

**PC0-PC7.** These 8 lines are organized as one I/O port (C). Each line may be configured as either an input with or without internal pull-up resistor or as an output under software control of the data direction register. Pins PC0 to PC3 are configured as open-drain (5V drive) in output mode while PC4 to PC7 are open-drain with 12V drive and the input pull-up options does not exist on these four pins. PC0, PC1 and PC3 lines when in output mode are "ANDed" with the SPI control signals and are all open-drain. PC0 is connected to the SPI clock signal (SCL), PC1 with the SPI data signal (SDA) while PC3 is connected with SPI enable signal (SEN, used in S-BUS protocol). Pin PC4 and PC6 can also be inputs to software programmable edge sensitive latches which can generate interrupts; PC4 can be connected to Power Interrupt while PC6 can be connected to the IRIN/NMI interrupt line.

**DA0-DA5.** These pins are the six PWM D/A outputs of the 6-bit on-chip D/A converters. These lines have open-drain outputs with 12V drive. The output repetition rate is 31.25KHz (with 8MHz clock).

**AFC.** This is the input of the on-chip 10 levels comparator that can be used to implement the AFC function. This pin is an high impedance input able to withstand signals with a peak amplitude up to 12V.

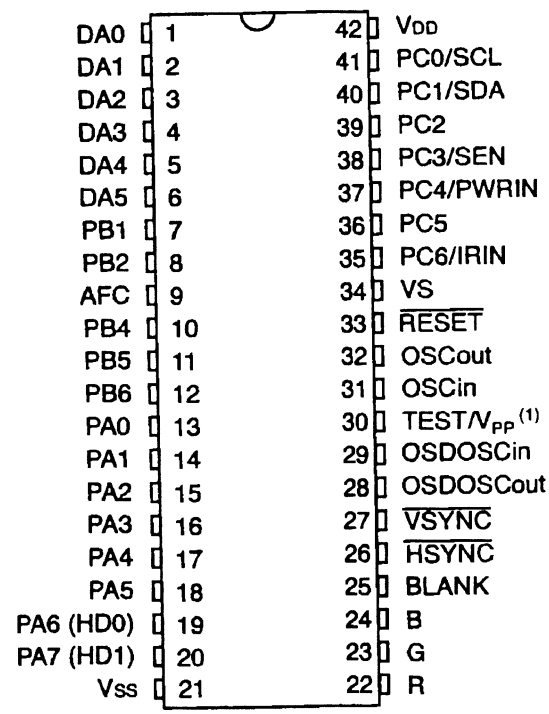
**OSDOSCin, OSDOSCout.** These are the On Screen Display oscillator terminals. An oscillation capacitor and coil network have to be connected to provide the right signal to the OSD.

**HSYNC, VSYNC.** These are the horizontal and vertical synchronization pins. The active polarity of these pins to the OSD macrocell can be selected by the user as ROM mask option. If the device is specified to have negative logic inputs, then these signals are low the OSD oscillator stops. If the device is specified to have positive logic inputs, then when these signals are high the OSD oscillator stops. VSYNC is also connected to the VSYNC interrupt.

**R, G, B, BLANK.** Outputs from the OSD. R, G and B are the color outputs while BLANK is the blanking output. All outputs are push-pull. The active polarity of these pins can be selected by the user as ROM mask option.

**VS.** This is the output pin of the on-chip 14-bit voltage synthesis tuning cell (VS). The tuning signal present at this pin gives an approximate resolution of 40KHz per step over the UHF band. This line is a push-pull output with standard drive.

### Pin configuration




(1) This pin is also the $V_{PP}$ input for OTP/EPROM devices

## Pin Summary

| Pin Function | Description |
|---|---|
| DA0 to DA5 | Output, Open- Drain, 12V |
| AFC | Input, High Impedance, 12V |
| VS | Output, Push- Pull |
| R, G, B, BLANK | Output, Push- Pull |
| HSYNC, VSYNC | Input, Pull- up, Schmitt Trigger |
| OSDOSCin | Input, High Impedance |
| OSDOSCout | Output, Push- Pull |
| TEST | Input, Pull- Down |
| OSCin | Input, Resistive Bias, Schmitt Trigger to Reset Logic Only |
| OSCout | Output, Push- Pull |
| RESET | Input, Pull- up, Schmitt Trigger Input |
| PA0- PA3 | I/ O, Push- Pull, Software Input Pull- up, Schmitt Trigger Input |
| PA4- PA5 | I/ O, Open- Drain, 12V, No Input Pull- up, Schmitt Trigger Input |
| PA6- PA7 | I/ O, Open- Drain, 12V, No Input Pull- up, Schmitt Trigger Input, High Drive |
| PB0- PB2 | I/ O, Push- Pull, Software Input Pull- up, Schmitt Trigger Input |
| PB4- PB6 | I/ O, Push- Pull, Software Input Pull- up, Schmitt Trigger Input |
| PC0- PC3 | I/ O, Open- Drain, 5V, Software Input Pull- up, Schmitt Trigger Input |
| PC4- PC7 | I/ O, Open- Drain, 12V, No Input Pull- up, Schmitt Trigger Input |
| $V_{DD}$, $V_{SS}$ | Power Supply Pins |

## DC ELECTRICAL CHARACTERISTICS

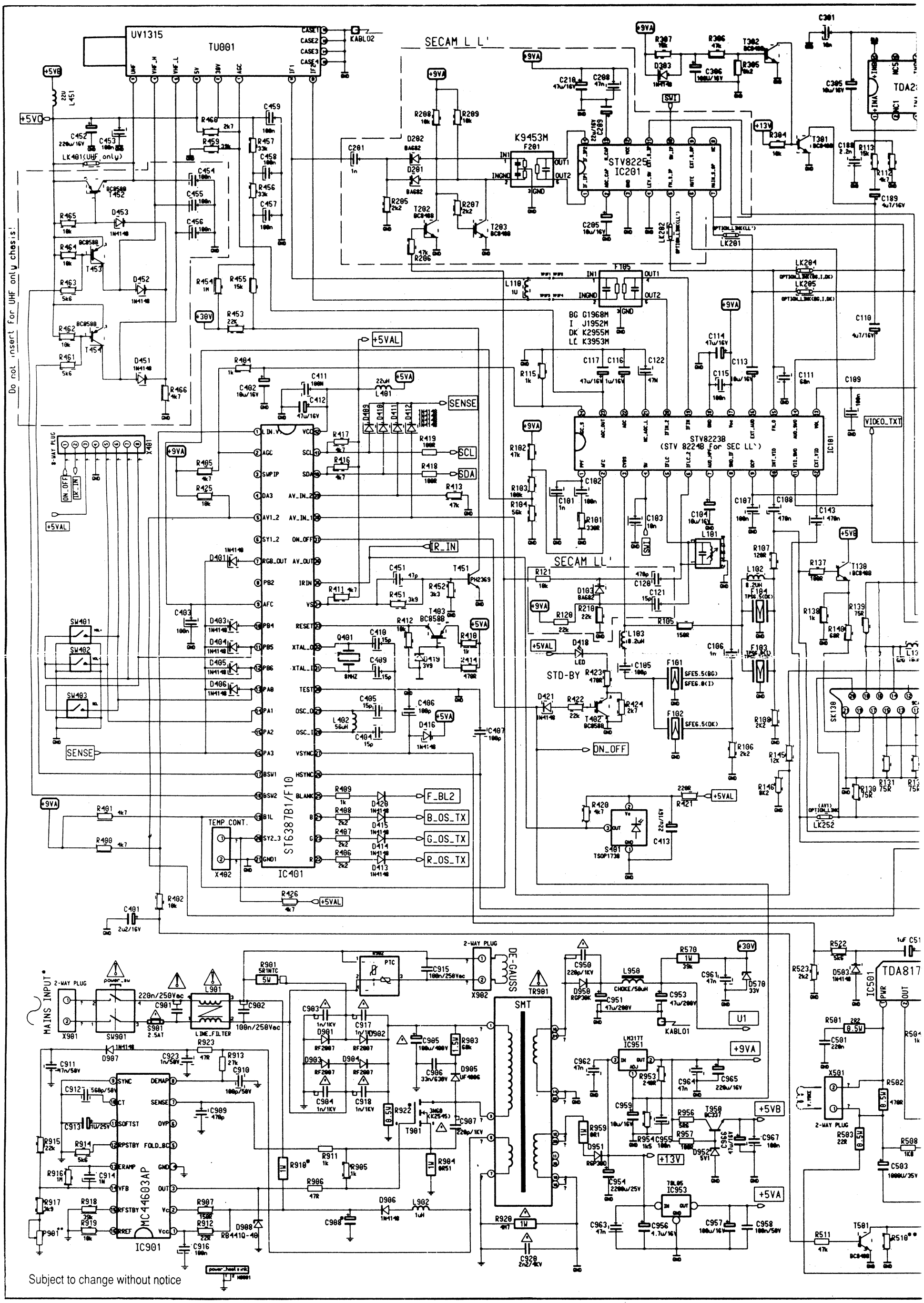
(TA = 0 to +70°C unless otherwise specified).

## DC ELECTRICAL CHARACTERISTICS

| Symbol | Parameter | Test Conditions | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $V_{IL}$ | Input Low Level Voltage | All I/O Pins | | | 0.2x$V_{DD}$ | V |
| $V_{IH}$ | Input High Level Voltage | All I/O Pins | 0.8x$V_{DD}$ | | | V |
| $V_{HYS}$ | Hysteresis Voltage(1) | All I/O Pins<br>$V_{DD}$ = 5V | | 1.0 | | V |
| $V_{OL}$ | Low Level Output Voltage | DA0-DA5, PB0-PB6, OSD Outputs, PC0-PC7, O0, O1, PA0-PA5<br>$V_{DD}$ = 4.5V<br>$I_{OL}$ = 1.6mA<br>$I_{OL}$ = 5.0mA | | | <br><br><br>0.4<br>1.0 | <br><br><br>V<br>V |
| $V_{OL}$ | Low Level Output Voltage | PA6-PA7<br>$V_{DD}$ = 4.5V<br>$I_{OL}$= 1.6mA<br>$I_{OL}$= 25mA | | | <br><br>0.4<br>1.0 | <br><br>V<br>V |
| $V_{OL}$ | Low Level Output Voltage | OSDOSCout<br>OSCout<br>$V_{DD}$ = 4.5V<br>$I_{OL}$= 0.4mA | | | <br><br>0.4 | <br><br>V |
| $V_{OL}$ | Low Level Output Voltage | VS Output<br>$V_{DD}$ = 4.5V<br>$I_{OL}$= 0.5mA<br>$I_{OL}$= 1.6mA | | | <br><br>0.4<br>1.0 | <br><br>V<br>V |
| $V_{OH}$ | High Level Output Voltage | PB0-PB7, PA0-PA3, OSD Outputs<br>$V_{DD}$ = 4.5V<br>$I_{OH}$ = – 1.6mA | 4.1 | | | V |
| $V_{OH}$ | High Level Output Voltage | OSDOSCout, OSCout,<br>$V_{DD}$ = 4.5V<br>$I_{OH}$= – 0.4mA | 4.1 | | | V |
| $V_{OH}$ | High Level Output Voltage | VS Output<br>$V_{DD}$ = 4.5V<br>$I_{OH}$= - 0.5mA | 4.1 | | | V |
| $I_{PU}$ | Input Pull Up Current<br>Input Mode with Pull-up | PB0-PB6, PA0-PA3,<br>PC0-PC3,<br>$V_{IN}$= $V_{SS}$ | – 100 | – 50 | – 25 | μA |
| $I_{PU}$ | Input Pull Up Current | OSCin<br>$V_{IN}$= $V_{SS}$ | – 50 | – 25 | – 10 | μA |
| $I_{IL}$<br>$I_{IH}$ | Input Leakage Current | OSCin<br>$V_{IN}$= $V_{SS}$<br>$V_{IN}$= $V_{DD}$ | – 10<br>0.1 | – 1<br>1 | – 0.1<br>10 | μA |
| $I_{IL}$ | Input Pull-down current in RESET | OSCin | 100 | | | μA |
| $I_{IL}$<br>$I_{IH}$ | Input Leakage Current | All I/O Input Mode<br>no pull-up<br>OSDOSCin<br>$V_{IN}$= $V_{DD}$ or $V_{SS}$ | -10 | | 10 | μA |
| $V_{DD}$RAM | RAM Retention Voltage in RESET Mode | | 1.5 | | | V |
| $I_{IL}$<br>$I_{IH}$ | Input Leakage Current | Reset Pin with Pull-up<br>$V_{IN}$= $V_{SS}$ | – 50 | – 30 | – 10 | μA |

# CTV CHASSIS 12.1

6BZ 820-01




D401: UHF ONLY TUNER
D403: BACKGROUND FREE OSD
D411: AV2
D406: SEC L/L'

OSD_LANG_ENGLISH: D404
OSD_LANG_FRENCH : D404 and D405
OSD_LANG_GERMAN : D405

*Operation Range 105VAC~270VAC: R910= 47K; R922=470K; C908=68uF
Operation Range 140VAC~270VAC: R910=120K; R922= -- ; C908=47uF

EMC related components: C130,C131,C,133,C134,C135,C136,C138,C139

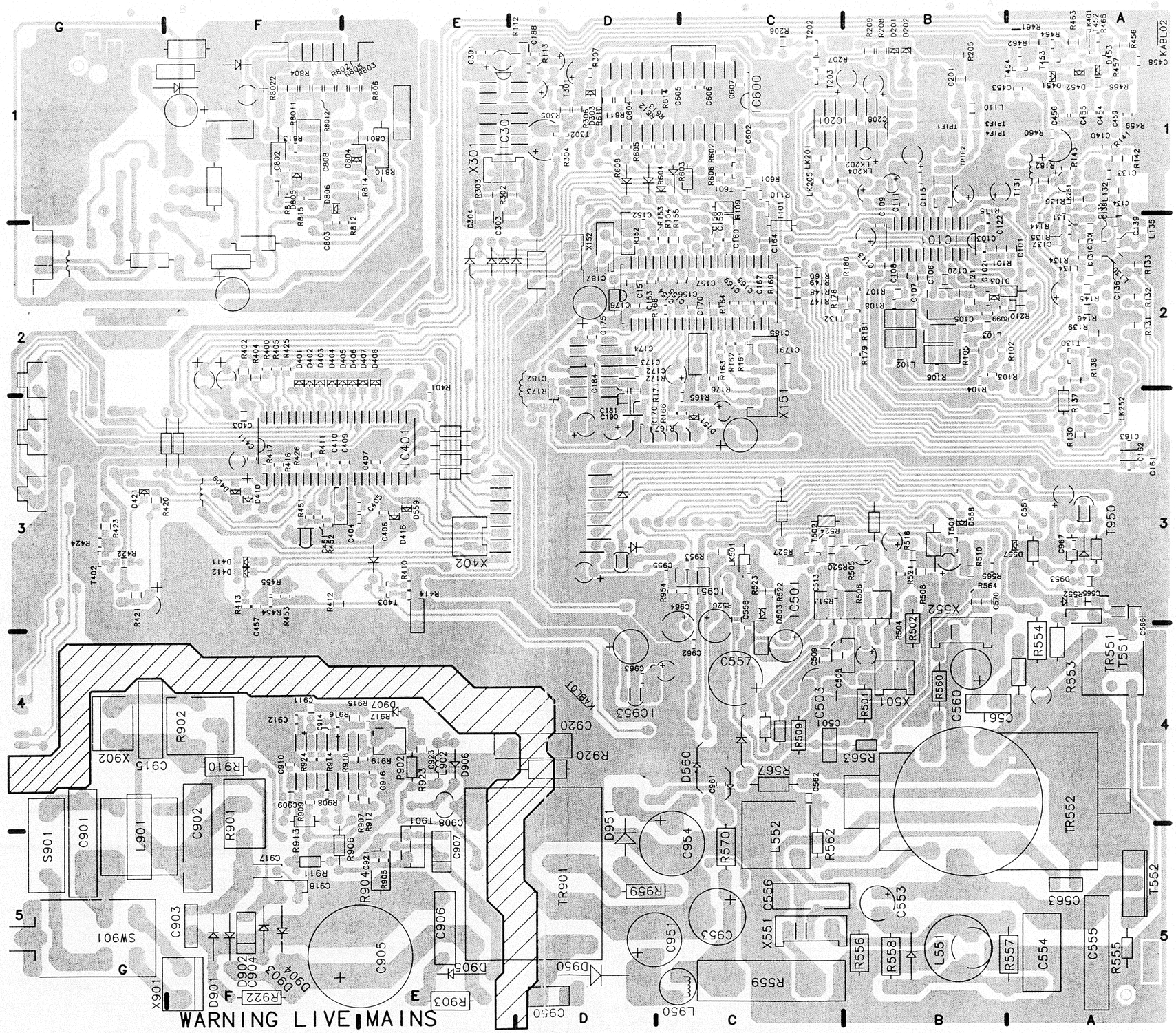
** 14" SAMSUNG CPT: U1=108V; R5
14" LG CPT: U1=104V; R5
14" PHILIPS CPT: U1=107V; R5
14" IRICO CPT: U1=113V; R5
20" SAMSUNG CPT: U1=121V; R5
20" LG CPT: U1=117V; R5
21" SAMSUNG CPT: U1=119V; R5
21" LG CPT: U1=113V; R5

14" Crown CTV7216

TELETEXT CIRCUITRY (OPTIONAL)

CRT MODUL

SUNG CPT: U1=108V; R510=150R; R560=1R2; R563=8k2; C504=100uF; C555=6n8F; R164=47k; R167=220k; U2=185V;P901=1k5; R527=open; R301=3R3; C570=open
CPT: U1=104V; R510=150R; R560=1R2; R563=8k2; C504=100uF; C555=6n8F; R164=47k; R167=220k; U2=185V;P901=1k5; R527=680k; R301=3R3; C570=open
_IPS CPT: U1=107V; R510=150R; R560=1R2; R563=8k2; C504=100uF; C555=6n8F; R164=47k; R167=220k; U2=185V;P901=1k5; R527=680k; R301=3R3; C570=open
CO CPT: U1=113V; R510=150R; R560=R47; R563=8k2; C504=100uF; C555=8n2F; R164=47k; R167=220k; U2=185V;P901=1k5; R527=680k; R301=3R3; C570=open
SUNG CPT: U1=121V; R510=100R; R560=R47; R563=6k8; C504=220uF; C555=9n1F; R164=10k; R167=100k; U2=220V:P901=2k2; R527=680k; R301=2R2; C570=10nF
CPT: U1=117V; R510=100R; R560=R10; R563=6k8; C504=220uF; C555=8n2F; R164=10k; R167=100k; U2=220V:P901=2k2; R527=680k; R301=2R2; C570=10nF
SUNG CPT: U1=119V; R510=100R; R560=R47; R563=6k8; C504=220uF; C555=8n2F; R164=8k2; R167=100k; U2=220V;P901=2k2; R527=680k; R301=2R2; C570=10nF
CPT: U1=113V; R510=100R; R560=R10; R563=6k8; C504=220uF; C555=8n2F; R164=8k2; R167=100k; U2=220V;P901=2k2; R527=680k; R301=2R2; C570=10nF


WARNING LIVE MAINS
IC301
IC600
IC401
IC101
IC501
IC953
X301
X151
X901
X902
X402
X552
X501
X551
TR901
TR552
TR551
SW901
S901
L901
L552
L551
T950
T552
T551
KABLOT
KABL02
G
F
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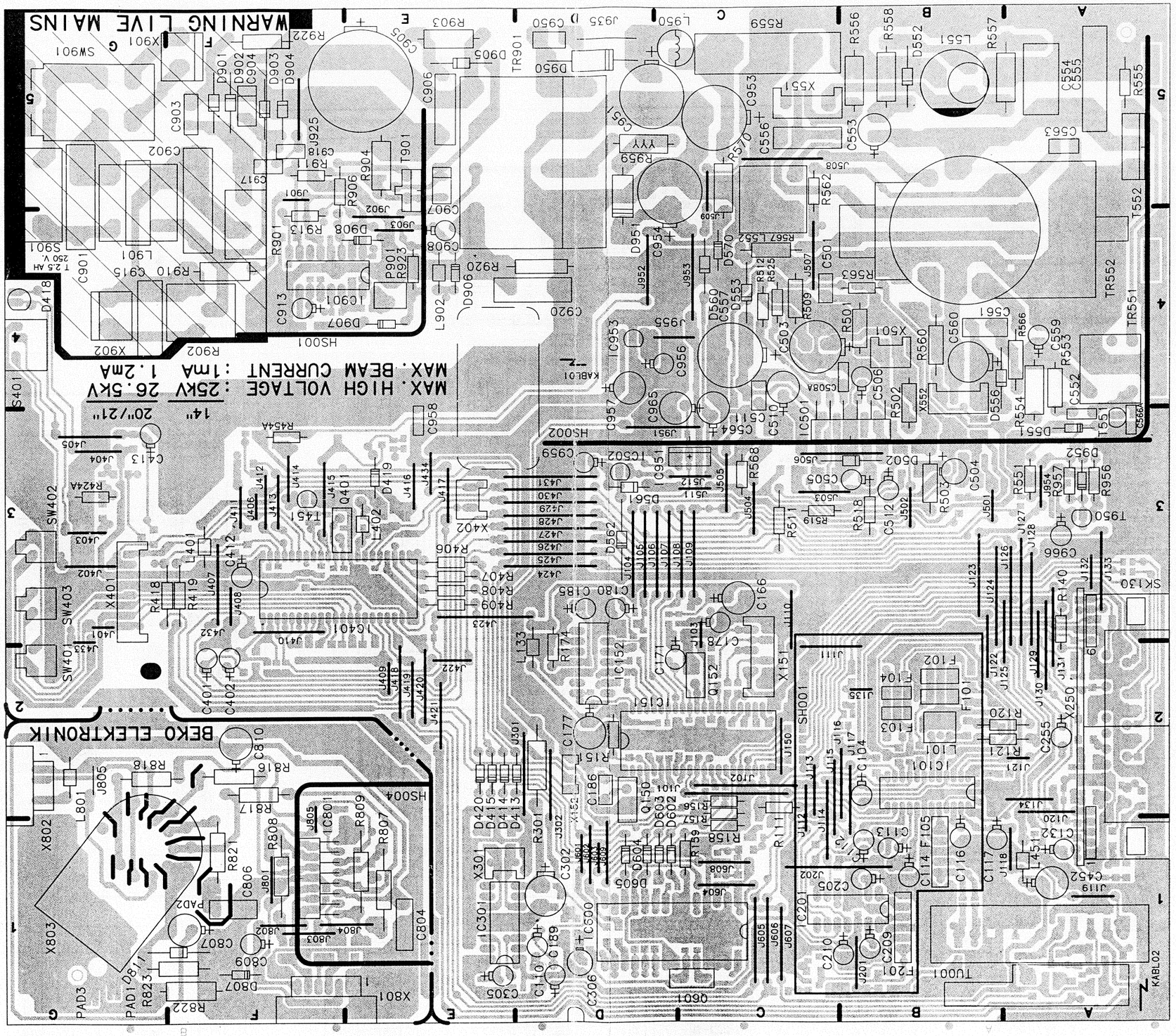
Crown CTV T216
ch. 12.1 CTV

Toshiba 22
Universal
FK 8187




Toshiba FT3286 + SFE